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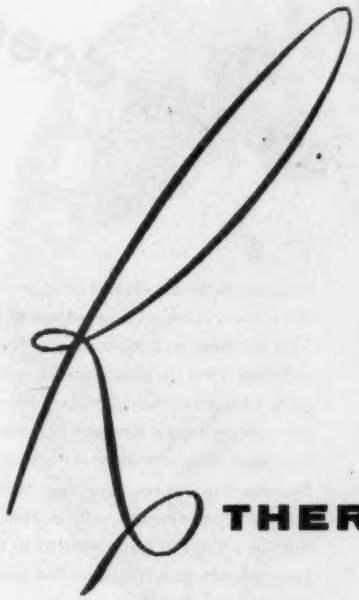

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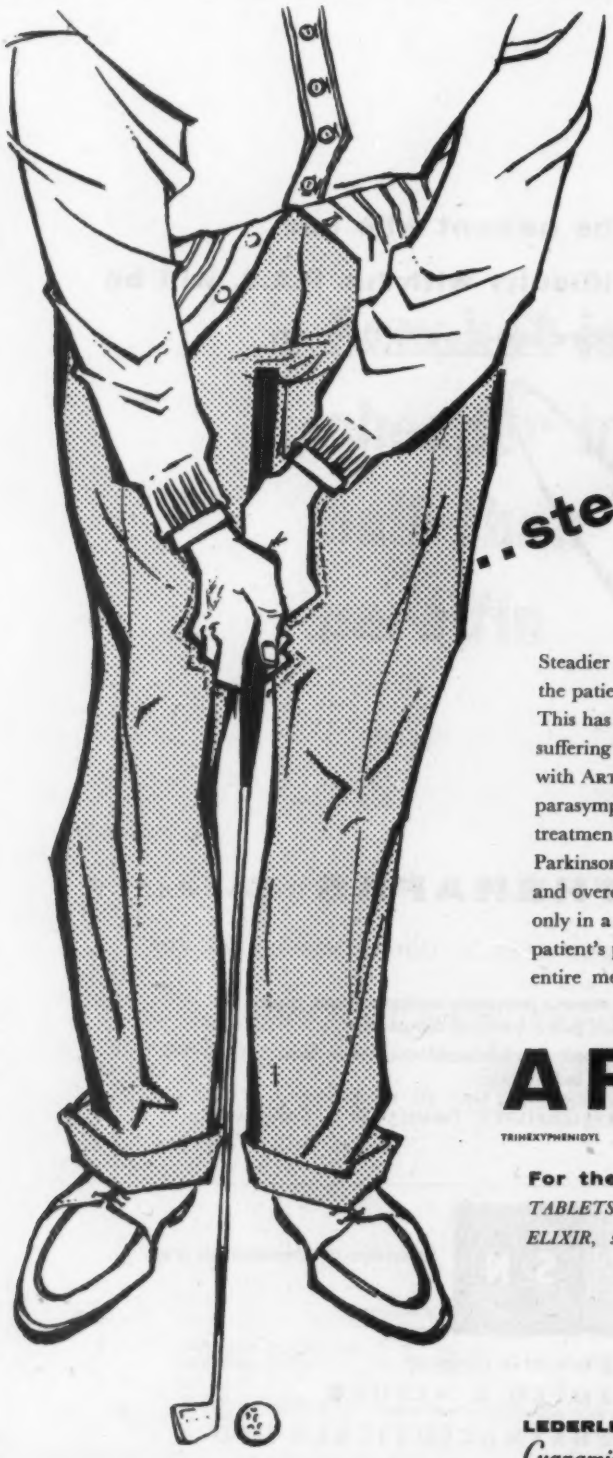

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LEDERLE LABORATORIES DIVISION
Cyanamid OF GREAT BRITAIN LTD., London, W.C.2

Nidoxital

TRADE MARK

anti-nausea capsules

make more mornings
"good mornings"
for patients with
nausea and vomiting of pregnancy

Each capsule contains:

Pyridoxine Hydrochloride	50 mgm.
Nicotinamide B.P.	25 mgm.
Benzocaine B.P.	100 mgm.
Pentobarbital Sodium B.P.	15 mgm.

Ortho

Ortho Pharmaceutical Limited
High Wycombe · England

9

For the patient who just doesn't get well

PROMOTING

—a return of appetite

—an increase in weight

—a sense of well-being

with Anabolex, the protein-anabolizing, non-virilizing steroid

PATIENTS who are run down or who are recovering from illness frequently suffer from faulty protein metabolism. They are in negative nitrogen balance. Protein, in effect, is being broken down and lost faster than it is being built up.

Anabolex (androstanolone) restores the physiological balance. Many clinical trials have shown that, following the administration of Anabolex, there is an immediate return of the body's capacity to build up protein. The patient feels better, eats better and gains weight.

Here, then, is a physiological "tonic" with a wide therapeutic range. The weakness, lassitude, lack of energy and interest associated with many pathological states may be rapidly overcome by the administration of Anabolex.

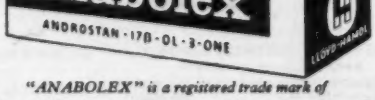
Anabolex can be safely given to patients of all ages and both sexes; in therapeutic doses, its virilizing properties are almost negligible. The only known contra-indication is prostatic carcinoma.

INDICATIONS:

Middle-aged or elderly people who are debilitated or "run down."

Preparation for and recovery from planned surgery. Convalescent patients. Premature infants. The child or adolescent who is under weight. Anorexia. Asthenia. Malnutrition. Wasting diseases.

PRESENTATION: In vials of 25 and 100 tablets, each tablet containing 25 mg. Androstanolone. Anabolex can be prescribed on Form E.C. 10. Basic N.H.S. price 20/- and 70/-.



"ANABOLEX" is a registered trade mark of
Lloyd-Hamol Ltd., 11 Waterloo Place, London, S.W.1

In coma **delirium** *toxic depression*

PARENTROVITE

Injectable B complex with vitamin C

A massive dose of injectable B complex with vitamin C . . . to restore normal cerebral functions in toxic states due to narcotic or barbiturate drugs, alcohol, or acute infections.

In boxes of 3 pairs of ampoules. *Hospital pack also available.*

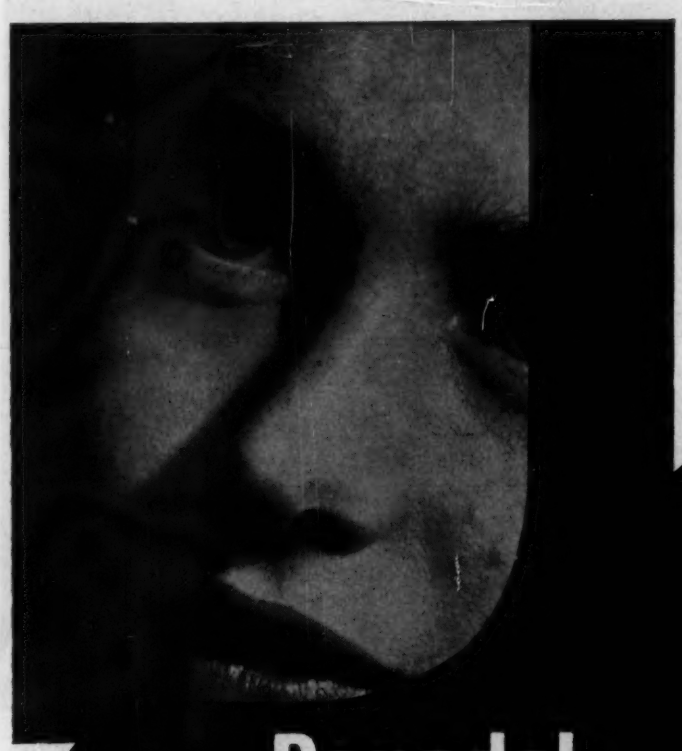
A preparation **OROVITE,** containing the same B complex vitamins in high concentration for oral administration, is also available. *In tablets and elixir.*

Two groups of preparations containing the vitamin B complex in less massive concentration are: **BECOVITE & BEFORTISS.** *In tablets, ampoules and elixirs.*

VITAMINS LIMITED (DEPT. B.9.) UPPER MALL, LONDON, W.6.

...and in correcting an iron deficiency anaemia, it is to be noted that many iron salts give rise to irritation of the intestinal mucosa. Even for that reason alone Ferromyn (ferrous succinate) is the most suitable method of administering iron; it is readily absorbed and has by far the highest utilisation co-efficient of the various iron salts available. Ferromyn has been fully demonstrated to have a superior clinical and haematological response in the treatment of iron deficiency anaemias of pregnancy, in infancy and ...
FERROMYN
for speedy oral correction of all iron deficiency states
FERROMYN TABLETS AND ELIXIR
Each tablet/teaspoonful contains
Ferrous Succinate 150mg
FERROMYN 'B' TABLETS AND ELIXIR
Each tablet/teaspoonful contains
Ferrous Succinate 150mg
Aneurine Hydrochloride 1mg
Riboflavin 1mg
Nicotinamide 10mg
CALMIC LIMITED Crewe · Crewe 3251-5
London: 2 Mansfield Street · W1 · Langham 8038-9

Aspirin sensitivity?



Constipation, gastric irritation, allergy and other undesirable side effects may follow the use of analgesics based on the aspirin–codeine–phénacetin formula. Panadol does not contain any of these substances but has the single active ingredient N-acetyl-p-aminophenol. It does not cause gastric irritation or constipation and may safely be given to patients with peptic ulcer and to those who are intolerant of other analgesics

Medical literature is available on request.

Panadol

is safe for everyone

Tablets: 0.5 G., N-acetyl-p-aminophenol. In cartons of 20, in bottles of 100 and 500, and in tins of 2500

Basic N.H.S. cost of continuous treatment (2 tabs. t.d.s.) for one week 3/5.

Bayer Products Limited
Neville House, Kingston-on-Thames, Surrey.
Associated exporting company: Winthrop Products Limited.

BAYER

PANADOL is a registered trade mark.

**K

For the prevention and treatment of infections of the mouth and throat

SALIVA TESTS prove that 'Hibitane' Lozenges are more active in the mouth than other antiseptic lozenges. When 'Hibitane' Lozenges are sucked at 2-hourly intervals the oral streptococcal counts show up to a one-hundred-fold reduction.

'Hibitane' Lozenges each contain 5 mg. 'Hibitane' chlorhexidine Dihydrochloride, with 2 mg. Benzocaine B.P.—sufficient to ease pain without interfering with the swallowing reflex or hindering healing.

Noteworthy characteristics

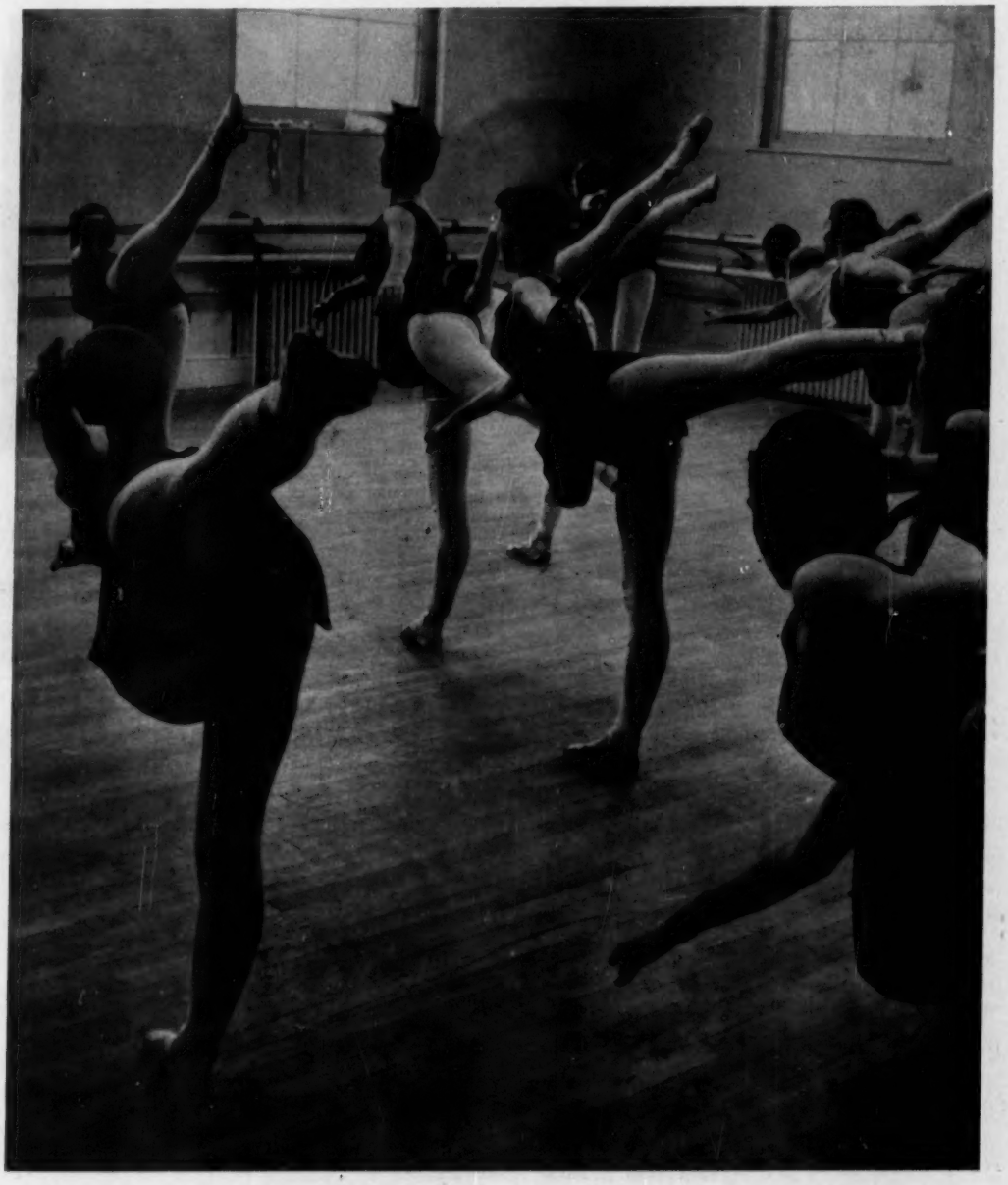
Powerful antibacterial effect; safe; bacterial resistance cannot be induced; pleasantly flavoured and well liked by children.

'Hibitane' *antiseptic lozenges*

Available in tubes of 12 lozenges

IMPERIAL CHEMICAL INDUSTRIES LIMITED Pharmaceuticals Division Wilmslow Cheshire

PH.789



The lithesome grace of the ballet dancer's limbered movements is possible only with continued practice. Such controlled activity is not easily or painlessly achieved by most of us for, however willing the spirit may be, the flesh often proves weak. Algipan will not prevent muscle aches from developing but, when gently rubbed into the skin, it will quickly and pleasantly produce an almost immediate relief from the pain of muscular strains and spasm and, in consequence, an increase in mobility.

Packs: Tubes of 40 grammes and 1 lb. jars.

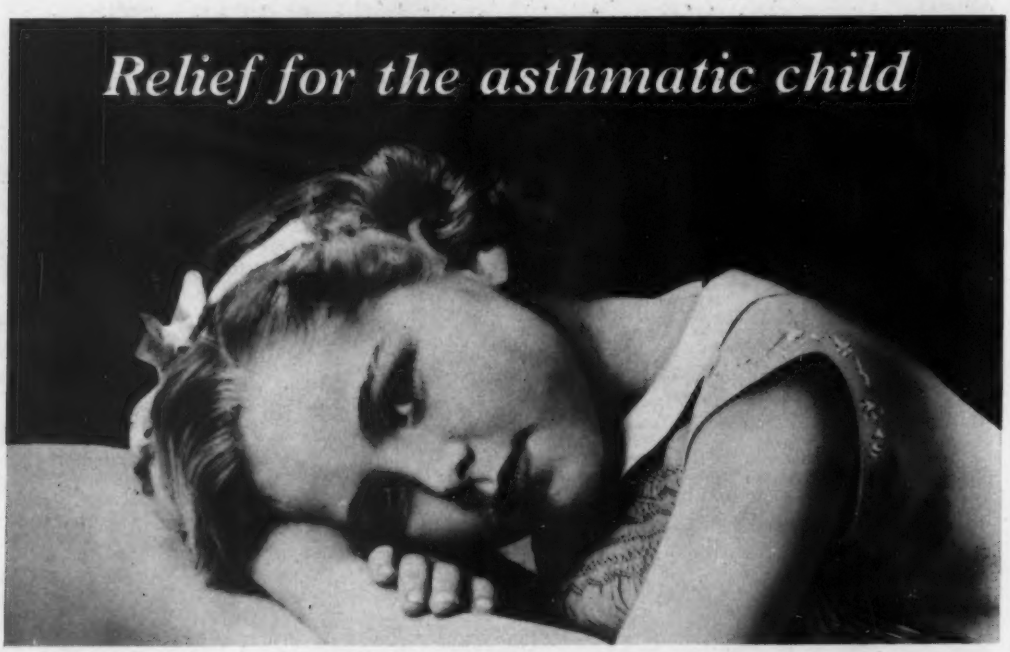
ALGIPAN*

THE RELIABLE AID TO ACTIVITY

**trade mark*

Wyeth John Wyeth & Brother Limited, Clifton House, Euston Road, London, N.W.1

Alg.2



UNIQUE BUFFERED THEOPHYLLINE SYRUP

Relief from the apprehension and acute distress of an asthmatic attack is provided by 'ENGLATE.' In almost all cases gastrointestinal disturbance is entirely absent. The combination of theophylline sodium with glycine permits full and effective therapeutic activity and by reducing gastric precipitation of theophylline enables larger doses to be prescribed.

ENGLATE

Regd. Trade Mark — *Theophylline Sodium Glycinate*

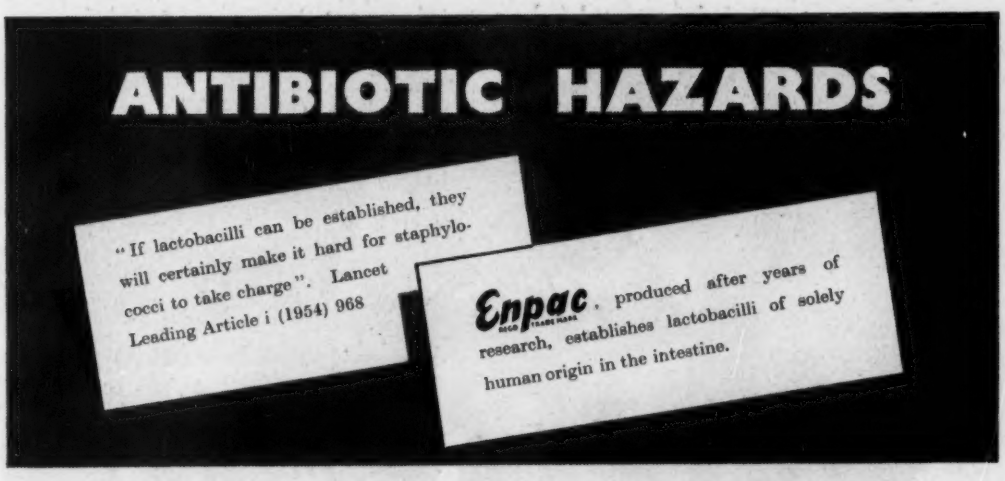
SYRUP (containing 120 mg. of theophylline sodium glycinate per 4 ml.) for children up to 12 years. Available in bottles of 8 fluid ounces.

TABLETS (300 mg. of theophylline sodium glycinate). Available in bottles of 50 and 500.

Samples and literature will gladly be sent on request

A Nicholas Product

A. & G. Nicholas LTD. *Slough, Bucks, England*


ANTIBIOTIC HAZARDS
"If lactobacilli can be established, they will certainly make it hard for staphylococci to take charge". Lancet Leading Article i (1954) 968
Enpac, produced after years of research, establishes lactobacilli of solely human origin in the intestine.

Restoring the balanced gut flora

ENPAC is a new and unique preparation of antibiotic-resistant strains of Lactobacillus acidophilus in a vehicle of the vital growth factors necessary for the strains to become established and multiply in the human gut. When administered during oral antibiotic therapy, these strains replace the intestinal strains of L. acidophilus, and an important part of the bacterial flora is maintained intact. There is substantial evidence which has proved that ENPAC can also be highly beneficial in certain intestinal disorders.

Extract from Lancet *article on clinical trials at Bristol* :

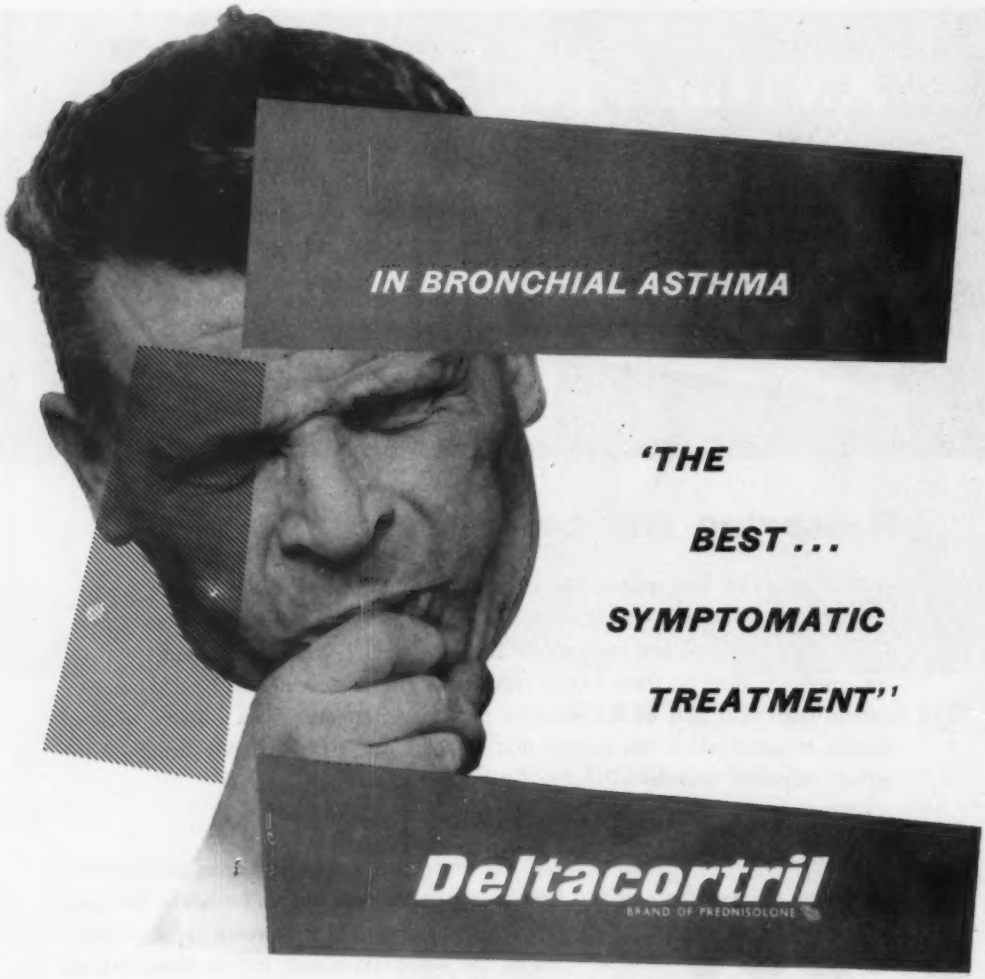
" It was found that the staphylococci increased in both groups at the beginning of antibiotic therapy. Staphylococci continued to increase in the patients taking the antibiotic alone, but in those taking Enpac there was a pronounced drop in numbers following the initial rise. Simultaneously, in this latter group the lactobacilli were rapidly established and continued to multiply. This followed the elimination of the normally non-resistant lactobacilli by the antibiotic during the early days of treatment." (*Lancet*, 1957, i, 899)

Enpac

ENPAC is prescribable on Form E.C.10. Basic N.H.S. Price 14/5 per 60 gramme tin.

Samples and literature will be sent to the medical profession on request.

Developed by Aplin & Barrett, Ltd., Biologicals Division.
Distributed by : LLOYD - HAMOL LTD.
11, Waterloo Place, London, S.W.1. WHItehall 8654/5/6



TO ESTABLISH CONTROL Suppressing dosage varies with the needs of the individual. Initially, however, even in severe intractable conditions, treatment begins at a total daily dosage of 30 mg. **2 x 5 mg. Deltacortril Tablets t.i.d.**

TO MAINTAIN CONTROL When control has been established, dosage is reduced in order to determine the minimum effective maintenance dose. Every two or three days the total daily intake is reduced by one half tablet (2.5 mg.). These reductions continue until the desired level is reached. Maintenance doses average between 10 and 15 mg. daily **1 or 1½ x 5 m.g. Deltacortril Tablets b.d.**

Deltacortril* BRAND OF PREDNISOLONE

THE MOST POTENT AND THE SAFEST CORTICOSTEROID

PFIZER PHARMACEUTICALS
Manufactured at Sandwich and processed at Folkestone, Kent

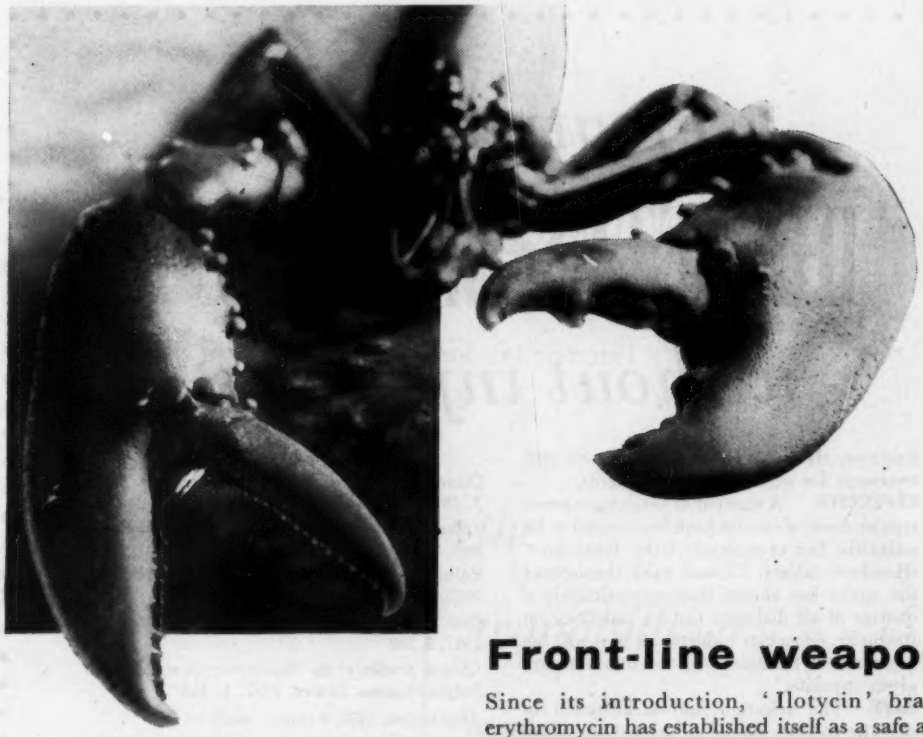
Pfizer

069/P

18

*Registered Trade Mark

[1]Schwartz, E. (1956) *N.Y. St. J. Med.*, **56**, 570



Front-line weapon

Since its introduction, 'Ilotycin' brand erythromycin has established itself as a safe and potent oral antibiotic. Clinical experience has shown that it can play a vital part as a front-line weapon against a wide range of infections. 'Ilotycin' has a penicillin-like antibacterial spectrum, is powerfully bactericidal, has negligible effect on the normal intestinal flora, and is fully effective by mouth. It has accordingly become the logical first choice after penicillin in the treatment of common infections.

Recent reports have stressed the value of 'Ilotycin' in treating the serious complications of influenza.

The average daily dose is 1 Gm. increased in severe infections.

'Ilotycin' is available as Tablets of 100 mg. and 250 mg.; also as 'Ilotycin' Paediatric and as 'Ilotycin Glucoheptonate' Intravenous.

'ILOTYCIN'

THE ORIGINAL ERYTHROMYCIN

DISCOVERED BY *Lilly*

ELI LILLY & COMPANY LIMITED · BASINGSTOKE · ENGLAND

19

Treatment of

DIABETES MELLITUS

without injections

Rastinon »Hoechst« tablets provide an oral treatment for certain diabetic patients.

EFFECTIVE A number of patients on small regular doses of insulin have been found to be suitable for treatment with Rastinon »Hoechst« tablets. Clinical work throughout the world has shown that approximately a quarter of all diabetics can be stabilized on Rastinon »Hoechst« tablets. A few of the more recent references to the literature are given opposite.

SAFE The selection and stabilization of diabetic patients should be carried out under strict medical supervision. For those patients found to be suitable, Rastinon »Hoechst« tablets provide a safe form of therapy and many have now been on oral treatment for two years. No cases of proven dyshaemopoiesis or other serious side-effects due to the drug have been reported.

SIMPLE From 2 to 4 tablets a day are normally all that is required to replace the insulin with its concomitant syringe, needles, swabs, and often nursing assistance as well. The normal regime of urine examination and dietary control remains necessary.

Packs: bottles of 100 and 500 tablets.

The basic price to the National Health Service as dispensed from a 500 tablet bottle is 2.97d per tablet and the total cost to the National Health Service, with all allowances, is less than 4d per tablet.

Each tablet contains 0.5 G. of N-Butyl-N¹-toluene-p-sulphonylurea; (Tolbutamide).

REFERENCES:

Clinical Experience with Tolbutamide, *Brit. Med. J.*, 1957, **2**, 323

Tolbutamide in Treatment of Diabetes Mellitus, *Brit. Med. J.*, 1957, **2**, 325

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Clinical Studies of the Hypoglycaemic action of the Sulphonylureas, *Lancet*, 1957, **1**, 753

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New and Non-official Drugs, *J.A.M.A.*, 1957, **164**, 1333

Dtsch. med. Wschr., 1956, **81**, 823-846

Dtsch. med. Wschr., 1956, **81**, 887-906

Dtsch. med. Wschr., 1957, **82**, 1513-1592 (Entire issue)

RASTINON

»HOECHST«

TABLETS

(TOLBUTAMIDE)

HOECHST PHARMACEUTICALS LIMITED · SLOUGH

Distributors in the United Kingdom

HORLICKS LIMITED · SLOUGH · BUCKS

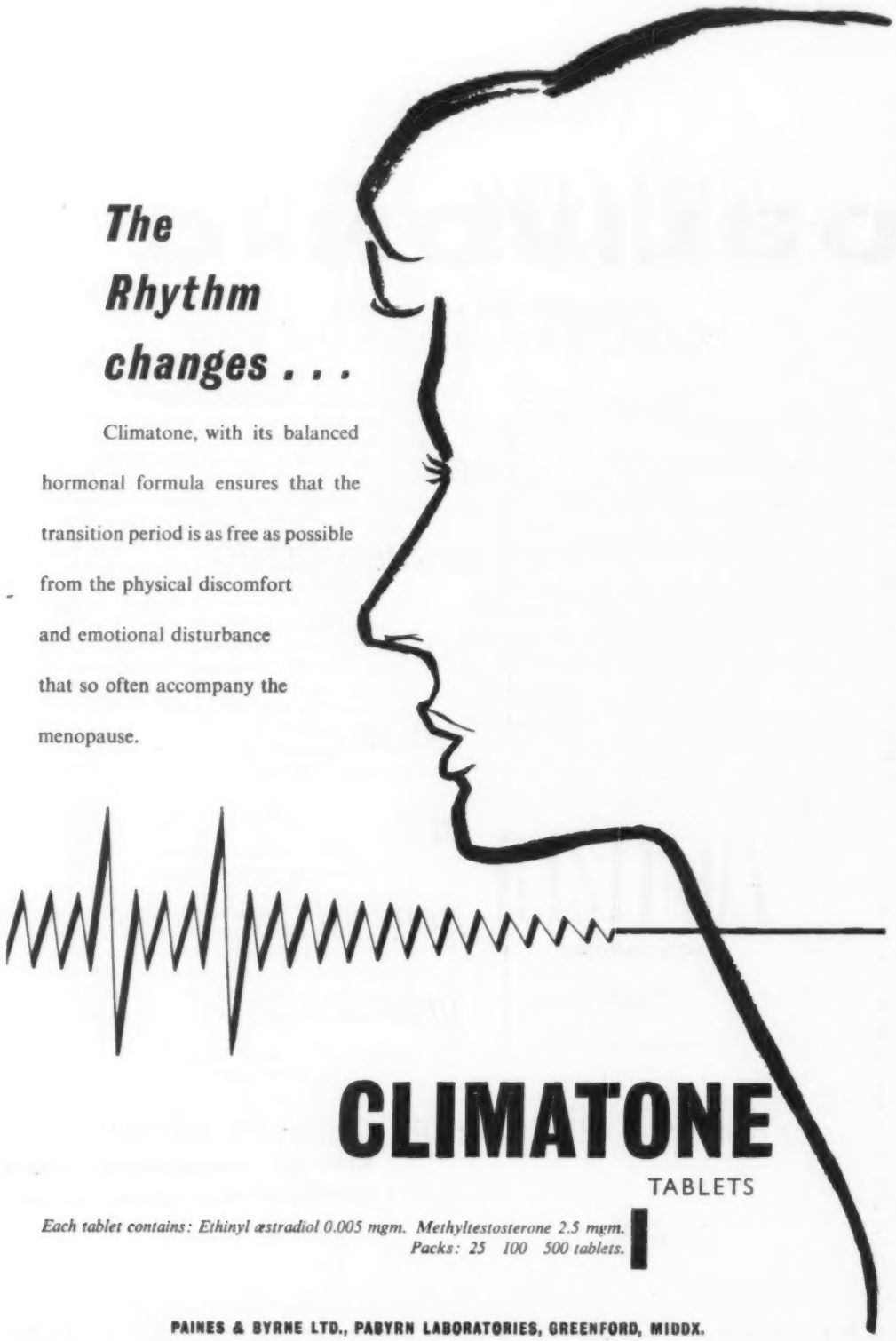
167-65M

OBLIVON-C

(Methylpentynol carbamate)

the
tranquillizer
safe
for use
in
general
practice

BRITISH SCHERING LIMITED
Kensington High Street, London W8



The Rhythm changes . . .

Climatone, with its balanced hormonal formula ensures that the transition period is as free as possible from the physical discomfort and emotional disturbance that so often accompany the menopause.

CLIMATONE

TABLETS

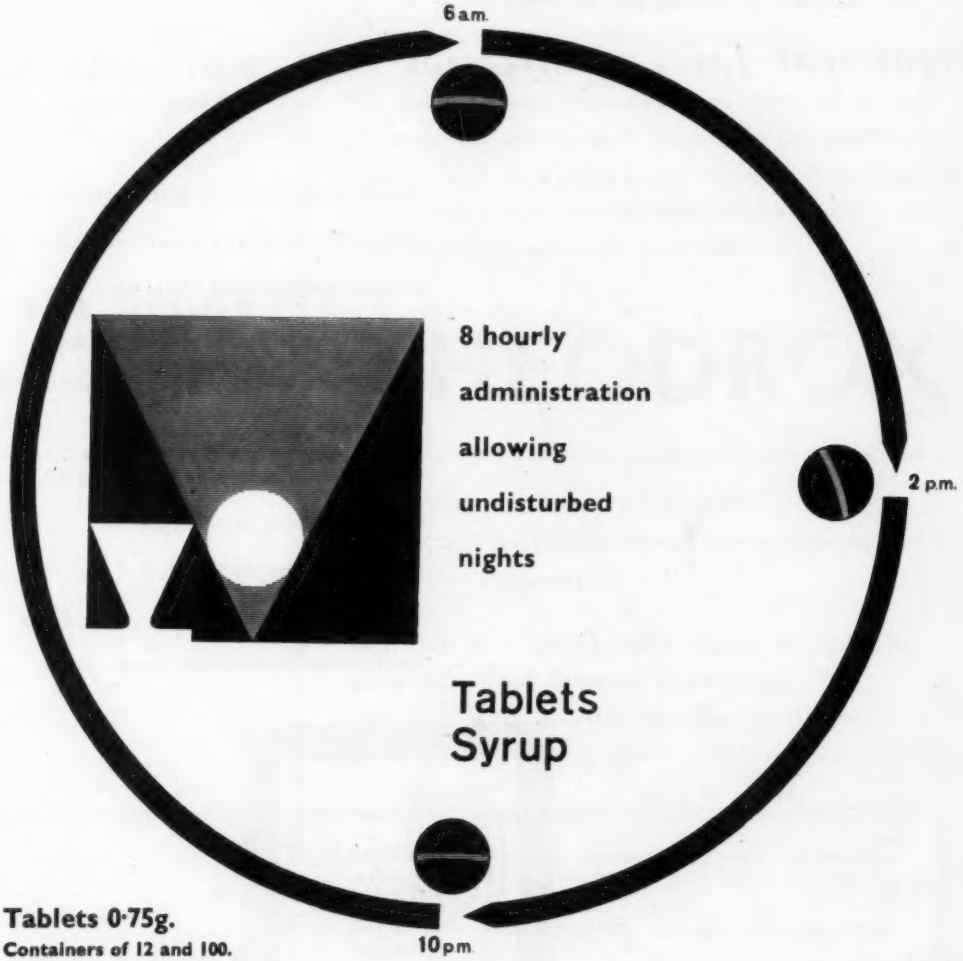
Each tablet contains: Ethinyl æstradiol 0.005 mgm. Methyltestosterone 2.5 mgm.
Packs: 25 100 500 tablets.

PAINES & BYRNE LTD., PABYRN LABORATORIES, GREENFORD, MIDDX.

Geigy

Dosulfin®

a new
mixed
Sulphonamide



8 hourly
administration
allowing
undisturbed
nights

Tablets
Syrup

Tablets 0·75g.
Containers of 12 and 100.

Syrup 10%
Bottles of 50 ml.
(a graduated measure is supplied with each package of syrup).

® Regd. Trade Mark

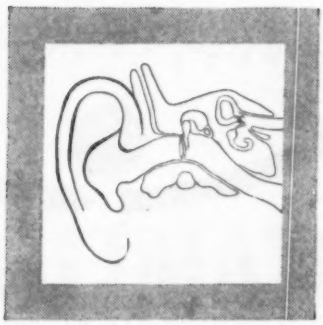
Dosulfin consists of equal parts of
Sulphaproxyline and Sulphamerazine

Geigy Pharmaceutical Company Ltd.
Manchester 23

PH 119
23

simpler, swifter, surer
treatment for ear infection

CHLOROMYCETIN* Ear Drops greatly reduce the time and effort necessary to treat suppurative otitis media, chronic otorrhoea, and infections of fenestration and mastoid operation cavities. Treatment can be conveniently carried out, if necessary in the patient's home, and is effective in a matter of days as compared with previous techniques requiring long and tedious application under close supervision.



CHLOROMYCETIN *Trade Mark

EAR DROPS 10%

(Chloromycetin 10% in propylene glycol) in 5 c.c. vials, with dropper, & bottles of 100 c.c.

Parke, Davis
& Company Limited (Inc. U.S.A.)
HOUNSLOW, MIDDLESEX
Telephone Hounslow 2361

382

THE PROBLEM
To obtain high blood levels of theophylline easily . . .

For oral aminophylline therapy to be fully effective it is necessary to give a dose sufficient to produce high blood theophylline levels. However, because of gastric irritation vomiting often results. Alternative therapy with enteric coated tablets or suppositories is unreliable, and parenteral aminophylline is inconvenient.

THE SOLUTION
Oral 'Theodrox' . . .

The combination of dried aluminium hydroxide gel and aminophylline in 'Theodrox' ensures full therapeutic response with the minimum of gastric upset. Reproduceable blood levels comparable with those obtained from intramuscular injection can be obtained.

THE RESULT
A full Therapeutic response . . .

THEODROX
REGD.

Recent work[1,2] has shown that synthetic derivatives of theophylline are mostly unsatisfactory and all are more expensive.

Each 'Theodrox' tablet contains 3 grains aminophylline and 4 grains dried aluminium hydroxide gel.
'Theodrox' is also available combined with $\frac{1}{8}$ grain phenobarbitone where a degree of sedation is also required.

REFERENCES

1. *Brit. Med. J.* (1957) 2: 67
2. *Ibid.*, page 74

DOSAGE . . .

ASTHMA:— two tablets, repeated in 2-3 hours if necessary to control paroxysm and dyspnœa. For prophylaxis, one tablet 4 times daily.

DIURETIC:— two tablets initially, then one or two tablets three times daily.

ANGINA PECTORIS:— four to eight tablets daily. In suitable cases 'Theodrox' with Phenobarbitone tablets can replace some or all of the 'Theodrox'.

PACKS:— Bottles of 25, 100 and 1,000 tablets.

RIKER

'Theodrox' (Brit. Pat. 727831) is a registered Trade Mark of

RIKER LABORATORIES LIMITED
LOUGHBOROUGH LEICS.

Original Everest Expedition photograph
kindly supplied by the
Swiss Foundation for Alpine Research

On top

Bellergal tablets
were carried
to the summit of Everest
by the members of
the 1956 Swiss Expedition
and widely used to counteract
the psychosomatic effects
of stress at high altitudes.

Bellergal

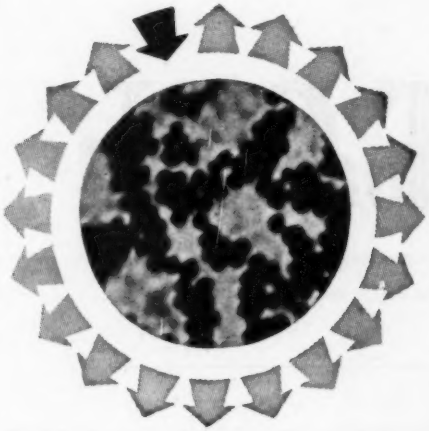
BY **SANDOZ**

is effective at all levels (central,
sympathetic, parasympathetic)
in the symptomatic treatment
of a wide variety
of psychosomatic disorders.

0.1 mg. total alkaloids of belladonna
0.3 mg. Ergotamine Tartrate B.P.
20 mg. Phenobarbitone B.P.

Sandoz Products Limited

Sandoz House
23 Great Castle Street
London, W.1



Overcome resistance....

'Rovamycin', an orally-administered antibiotic, has proved particularly valuable in combating resistant infections particularly those caused by staphylococci. 'Rovamycin' is remarkably well tolerated by adults and children.

Supplies: tablets, each containing 250 mg. spiramycin base.

'Rovamycin'
trade mark brand
SPIRAMYCIN

MANUFACTURED BY
MAY & BAKER LTD

An M&B brand Medical Product

DISTRIBUTORS: PHARMACEUTICAL SPECIALITIES (MAY & BAKER) LTD · DAGENHAM

NACTON

COMPOUND I.S. 499

BENCARD

a new, long-acting

INHIBITOR OF GASTRIC SECRETION

which, when given orally, reduces gastric secretion remarkably, and without side-effects in full therapeutic doses

Nacton promises to be of unusual value in the treatment of peptic ulcer. One dose every six hours provides continuous reduction of acidity.

Previously reported as Compound I.S. 499 (*Brit. med. J.*, ii, 275, 1957), Nacton is now available on National Health Service prescriptions.

PRESENTATION *Tablets each containing 2 mg. of (1-methyl-2-pyrrolidyl) methyl benzilate methyl methosulphate. Containers of 50, 250 and 1,000 tablets.*

LITERATURE AVAILABLE FROM

C. L. BENCARD LTD., PARK ROYAL, LONDON, N.W.10

601/80/3

Bradosol Lozenges

each containing 0.5 mg. Bradosol
(β-phenoxy-ethyl-dimethyl-dodecyl ammonium bromide)

---

for Mouth

and Throat Infections

of both bacterial

and fungal origin

INCLUDING ORAL THRUSH

Tubes of 20 lozenges

C I B A

'Bradosol' is a registered trade mark. Reg. user

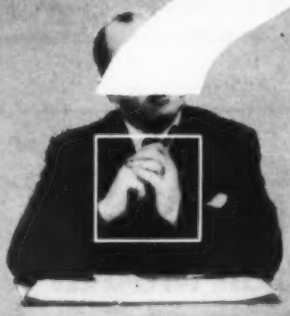
CIBA LABORATORIES LIMITED, HORSHAM, SUSSEX

Telephone: Horsham 4321. Telegrams: Cibalabs, Horsham

7/7

ECZEMA? INFECTION?

OR BOTH?



The Difficult Diagnosis

Diagnosis between an infected skin condition and an eczema is sometimes difficult.

Cortibiotic

skin ointment

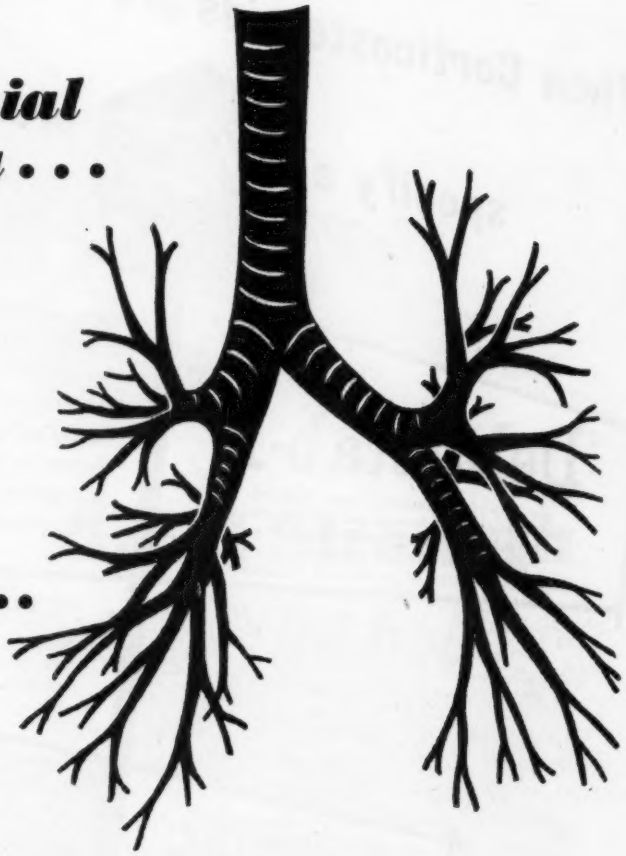
1.5% OF SOFRAMYCIN AND 0.5% OF PREDNISOLONE
IN A BLAND WATER-MISCIBLE VEHICLE

Cortibiotic ointment covers both possibilities, as the Soframycin controls the infection, while the prednisolone checks the eczema.

Packings
CORTIBIOTIC SKIN OINTMENT 5 and 15G. Tubes

ROUSSEL
LONDON N.W.10

Bronchial Asthma . . .



relieve the spasm . . .

with

★CHOLEDYL

A major advance in ORAL xanthine therapy

The most striking effects from the use of Choledyl are shown in the relief of the mild chronic state of bronchospasm and the reduction in the occurrence of acute attacks.
Choledyl provides theophylline blood levels up to 75 per cent higher than those obtained with oral aminophylline and it is essentially non-toxic in clinically effective dosage levels.

Choledyl is available in tablet form in two strengths, each tablet containing choline theophyllinate 100 mg. (coloured pink) or 200 mg. (coloured yellow). Supplied in bottles of 100 and 500 tablets.

MANUFACTURED IN ENGLAND

★ *under licence from* WARNER-LAMBERT PHARMACEUTICAL COMPANY, NEW JERSEY, U.S.A.,
owners of the trade mark: United Kingdom patent No. 736,443

ALLEN & HANBURYS LTD · LONDON · E·2
TELEPHONE: BISHOPSGATE 3201 (20 LINES). TELEGRAMS: "GREENBURYS, BETH, LONDON"

C58/536/II

When Corticosteroids are indicated . . .

specify a Boots product

Boots corticosteroids are manufactured from Commonwealth raw materials in our new plant at Nottingham, the most up-to-date of its kind in Europe. A comprehensive range is available to meet all therapeutic requirements.

'Deltastab-B'

Tablets of prednisolone 5 mg. buffered with aluminium hydroxide gel and magnesium trisilicate. The price of Deltastab-B is the same as ordinary prednisolone. Supplied in bottles of 30, 100 and 500 tablets.

'HYDROCORTISTAB'
(Hydrocortisone)
OINTMENT · CREAM · LOTION · EYE DROPS
EYE OINTMENT · LOCAL INJECTION
TABLETS · INTRAVENOUS INJECTION

'HYDROMYCIN'
(Hydrocortisone with Neomycin)
OINTMENT · EAR/EYE DROPS
EAR/EYE OINTMENT

'DELTASTAB'
(Prednisolone)
TABLETS

'CORTISTAB'
(Cortisone Acetate)
TABLETS · INJECTION · EYE DROPS · EYE OINTMENT

PREDNISONE —BOOTS
TABLETS

Literature and further information gladly sent on request
BOOTS PURE DRUG COMPANY LIMITED, NOTTINGHAM, ENGLAND
5311

Great Strength

rings the bell!

Uniquely strong . . . swift-acting . . . yet amply safe for children . . . 'Actidil' can provide a surer, more decisive answer to the nagging challenge of general allergic symptoms. This modern antihistamine gives relief within minutes. It has little tendency to evoke unwanted side-effects. Its benefits persist for some twelve hours. For adults, 'Actidil' is available as tablets; for children, as a pleasant tangerine-flavoured elixir. Given in either form it holds the promise of new comfort for many, if not all, of your allergic patients . . . today . . . and in the "pollen months" ahead.

TABLETS: (2·5 *mgm.) in bottles of* 25, 100 *and* 500
ELIXIR: (1 *mgm. per fluid drachm) in bottles of* 20 *fl. oz.*

'ACTIDIL'

TRIPROLIDINE HYDROCHLORIDE

Today's most potent antihistamine . . .
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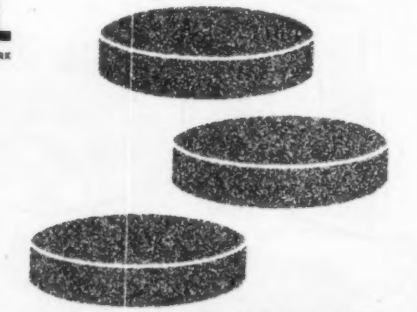

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ENVIRONMENTAL PENICILLIN AND PENICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS

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WORLD-WIDE reports agree that penicillin-resistant strains of *Staphylococcus aureus* recovered from patients in hospital have increased from a small proportion of the strains tested shortly after the introduction of penicillin (Rammelkamp and Maxon 1942, North and Christie 1945, Blair et al. 1946, Beigelman and Rantz 1950) to 50–90% at the present time (Barber 1947a and b, Barber and Rozwadowska-Dowzenko 1948, Barber and Whitehead 1949, Dowling et al. 1953, Finland and Haight 1953, Gould and Allan 1954). These strains are most prevalent among hospital inpatients, and smaller numbers have been isolated from hospital outpatients (Voureka and Hughes 1949, Rountree et al. 1951, Summers 1952) and the general population in the same geographical areas (Forbes 1949, Martin and Whitehead 1949, Vogelsang 1951, Linsell 1952, Dowling et al. 1953, Gould and McKillop 1954, Roodyn 1954, Rountree et al. 1954), whereas they are rare in communities where penicillin has not been administered (Hopps et al. 1954, Rountree 1956).

All naturally occurring penicillin-resistant staphylococci produce penicillinase, by virtue of which they are resistant to penicillin (Spink and Ferris 1947, Barber and Rozwadowska-Dowzenko 1948, Finland and Haight 1953, Florey et al. 1949). A few strains of apparently penicillin-sensitive *Staph. aureus* have been shown to contain penicillinase-producing variants, and these variants probably arise by mutation (Demerec 1945, 1948, Szybalski 1953) and possibly also by adaptation (Hinshelwood 1952, Barber 1953), but in either case their growth and further spread will be favoured by selective factors in the environment, such as penicillin.

The first described strains of penicillin-resistant *Staph. aureus* were observed in patients under treatment with penicillin (Rammelkamp and Maxon 1942, Blair et al. 1946, Harley et al. 1946), and it was considered that the resistant mutants were selected by the penicillin. The subsequent increase of penicillin-resistant strains in hospital inpatients and other persons treated with penicillin (Gould and McKillop 1954) may thus be explained on the basis of their frequent treatment with penicillin.

However, the proportion of penicillin-resistant strains of *Staph. aureus* is increasing among carriers in hospital who are not receiving penicillin. This is usually explained by postulating a free interchange of organisms between the treated patients and these carriers (Knight and White 1956), but this presupposes that the penicillin-resistant organism has the power to replace the naturally occurring penicillin-sensitive carrier strains. So far there is no satisfactory evidence that this happens.

Further, if mutation takes place in each patient under treatment, a much greater variety of phage-types of penicillin-resistant staphylococci would be expected to occur in hospitals, whereas it is usual for only a few strains to be present in each hospital (Gould and Allan 1954, Maccabe and Gould 1956).

Also, patients infected with penicillin-sensitive strains before treatment would be expected to yield penicillin-resistant strains of the same type following treatment. In fact, most cases that are investigated show the penicillin-resistant strains to be of different type from the sensitive strain originally present.

Another possible explanation of the rapid colonisation of carriers in hospital is that these persons receive in their noses enough penicillin inhaled with air and dust and transferred from their hands and fingers to maintain a nasal concentration of penicillin inhibitory to sensitive staphylococci. This would be important because the anterior nares are the primary site of colonisation in the carrier, and the staphylococci are disseminated from the nose to other parts of the body of the carrier and to his clothes, to the air and dust, to fomites, and to other persons.

Evidence for this hypothesis was sought by testing the environment in a hospital for free penicillin and comparing the results with those found in a factory handling penicillin where penicillin-resistant staphylococci had been found to predominate among carriers (Gould 1957).

Materials and Methods

The hospital examined was a large general hospital with about 900 doctors and nurses. Permanent nasal carriers comprised 53% of the staff, and the proportion of these carriers harbouring penicillin-resistant strains exceeded 90%.

The factory examined handled penicillin from bulk and dispensed it in various forms—crystalline, procaine, oily, and incorporated in creams. Other antibacterial agents were also handled.

Recovery of Penicillin

Penicillin was recovered on indicator plates, which were petri dishes cast with agar uniformly sown with a penicillin-sensitive microorganism, usually a staphylococcus susceptible to 0·02 μg. of penicillin per ml. After incubation, zones of inhibition of growth indicated antibacterial activity. That the zones of inhibition were due to penicillin was proved by inoculating a penicillin-sensitive staphylococcus on to one part of each zone of inhibition, and this staphylococcus plus penicillinase on to an adjacent part. If inhibition was due to penicillin, the staphylococcus grew on the penicillinase-treated area only. This proved that the inhibition was due to penicillin.

The penicillin content of the air was measured by directly exposing indicator plates to settling particles (settling plates) and also by means of an impinger sampler, taking 25 c.ft. of air a minute through 400 small holes on to an indicator plate (the instrument was a modified Du Buy and Crisp sieve-plate-sampler with a collection efficiency of about 60% for particles within the range 1-5 μ, and probably nearly 100% for particles of 20–100 μ). Most of the areas of inhibition of growth on the indicator plates were circular and discrete and must have resulted from a single particle of penicillin. The concentration of penicillin required to produce equivalent zones of inhibition was obtained by comparison and calculation.

Indicator plates identical with those used in the sampling experiments were prepared. Various con-

centrations of penicillin were placed in these plates, either in the form of saturated paper discs or as tiny drops of penicillin solution. The diameters of the zones of inhibition of growth were measured and plotted on a graph against the amounts of penicillin in the series.

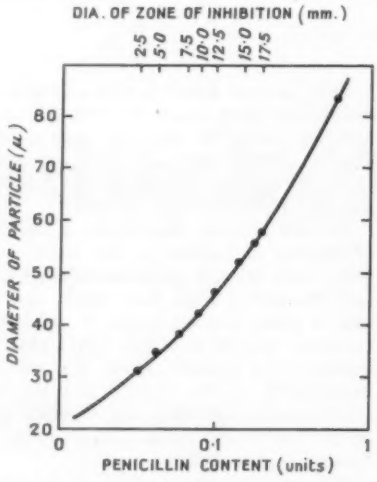

Fig. 1—Relation of diameter of zone of inhibition on indicator plate to penicillin content and size of particle. The scale of penicillin content is logarithmic.

On the basis that the particles recovered from the air consisted either of pure procaine penicillin or of the sodium salt of benzyl penicillin, an equivalent particle-size was calculated and a graph prepared relating the zone of inhibition of growth to penicillin content and size (fig. 1). The smallest amount of penicillin giving a definite zone of inhibition of growth in these experiments was 0·02 μg. This amount of procaine penicillin was contained in a sphere 36 μ in diameter, and of sodium benzyl penicillin in a sphere 32 μ in diameter. Indefinite zones of inhibition were due to smaller particles, and particles of pure penicillin less than 25 μ did not give individual zones of inhibition and could only be detected when enough of them aggregated at one place on the medium to produce recognisable inhibition.

Sampling of Penicillin from Other Sources

The presence of penicillin on fomites was demonstrated in an approximate manner by swabbing the surface of the fomite with dry or wet swabs and rubbing these swabs thoroughly over the surface of an indicator plate. Inhibition of growth indicated the presence of penicillin. Fingers and hands were tested for contamination with penicillin by impressing the finger on an indicator plate.

The anterior nares were sampled most successfully by smearing the skin lining the nasal vestibule with a water-lanoline cream and, after a suitable interval, removing some of the cream with sterile filter-paper discs and transferring the discs to indicator plates.

Detection of Nasal Carriers of Staph. aureus

Nasal carriers were detected by swabbing the anterior nares and culturing the swabs on milk-agar (Mackie and McCartney 1953). Staphylococcal colonies were tested for the production of coagulase (Fisk 1940, Cadness-Graves et al. 1943), penicillin sensitivity (Gould and Bowie 1952), and the production of penicillinase (Gots 1945); coagulase-positive strains were further tested for susceptibility to a standard set of bacteriophages.

TABLE I—ENVIRONMENTAL PENICILLIN IN HOSPITAL

Hospital site	Amount of penicillin settling on 12 sq. in. per hour (μg.)	Penicillin content of air per 100 c.ft. measured by sieve sampler (μg.)	Presence of penicillin on fomites	Presence of penicillin on hands and in nares of staff
Inpatient department:				
Doctors' rooms ..	0–0·02	Not tested	Not tested	Not tested
Corridor ..	0–0·05	Not tested	Not tested	Not tested
Medical ward ..	0·06–0·10	Trace–0·4	Not tested	Not tested
Surgical ward ..	0·05–0·25	Trace–0·5	Not tested	Not tested
Dispensary	1·0–1·70	0·5–35·0	Not tested	Not tested
Outpatient department:				
Minor-surgery room	1·0–5·0	1–50	Present	Present
Dressing-rooms ..	0·5–1·0	1–15	Present	Present
Corridor ..	0–0·15	Trace–0·6	Not tested	Not tested
Waiting-room ..	0–0·20	Trace–1·0	Not tested	Not tested
Small ward ..	0–0·05	Traces	Present	Present
Doctors' room ..	0–0·05	Not tested	Not tested	Not tested
Operating-theatre	0	0	Not tested	Not detected

Results

AIR SAMPLING IN HOSPITAL

The results of sampling air in various parts of the hospital show that penicillin was present in variable amounts in the air or in the dust of all the sites tested. Table I shows the amount of penicillin detected by the settling plates and the amount recovered by sampling the air with the sieve sampler. The smallest amounts of penicillin were found in the doctors' side-rooms, where penicillin was presumably never handled. Larger amounts were found in open medical and surgical wards, as well as in some corridors. The dispensary air contained a great deal of antibiotic activity, especially nearest the room where antibiotics were dispensed. A proportion of the activity was due to penicillin. The highest levels, however, were recorded in parts of the outpatient department, and this site was examined in greater detail and was especially suitable because penicillin was the only antibiotic used at that time.

Results of Sampling Outpatient Department

Within the department the amount of penicillin recovered varied greatly but was highest where penicillin was being administered—in the rooms used for minor surgery. During this investigation very little penicillin was being used or given to patients in any other part of the department. The amounts of penicillin recovered fell off rapidly with the distance from the incision rooms, and very small amounts were recovered from the doctors' retiring-room and the operating-theatre, which were geographically farthest removed (table I).

Examination of Persons and Fomites in Outpatient Department for Penicillin

Fomites were handled and the hands, previously shown to be free from antibiotic activity, were impressed on indicator plates. Amounts of penicillin sufficient to inhibit growth over the full plate were obtained in many instances after a few seconds' handling of articles such as trays, caskets, instrument-tray covers, dressing containers, and bottles in the dressing-rooms and rooms used for minor surgery (table I). The doctors' and nurses' hands were examined before washing at various times during the day. Amounts of penicillin sufficient to inhibit large areas of indicator plates were present on the hands and fingers of about half the doctors and nurses. Apparently these persons had picked up the penicillin from fomites by handling in the natural course of their duties. No attempt was made to estimate quantitatively the amounts present on the hands or the fomites.

Examination of Anterior Nares for Penicillin

The anterior nares of some of the doctors and nurses were tested. This was a crucial matter because if environ-

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TABLE II—NASAL CARRIAGE OF *Staph. Aureus* AMONG MEMBERS OF STAFF OF HOSPITAL OUTPATIENT DEPARTMENT AND DETAILS OF CARRIER STRAINS

Individuals	Presence of *Staph. aureus* in nares	Penicillin susceptibility of nasal strain	Bacteriophage types	Penicillin in nose and/or hands
Surgeon 1 ..	+++	Resistant	6/7/47/54	0
Surgeon 2 ..	—			0
Surgeon 3 ..	++	Resistant	52/52A/80	0
Surgeon 4 ..	—			0
Surgeon 5 ..	+++	Resistant	52/52A/79/80	Present
Surgeon 6 ..	—			Present
Nurse 1 ..	+++	Resistant	7/54/73/77	0
Nurse 2 ..	++	Resistant	7/54/73/77	Present
Nurse 3 ..	—			Present
Nurse 4 ..	+++	Resistant	52/52A/80	Present
Nurse 5 ..	+++	Resistant	52/52A/79	Present
Nurse 6 ..	+++	Resistant	NT	0
Nurse 7 ..	—		—	0

0 = none detected.

mental penicillin affects the growth of *Staph. aureus* it is most likely to do so in the nostrils, the primary site of colonisation in the carrier, and a selective concentration must be present at least for a considerable time. The results showed that all members of the staff working in the incision and dressing rooms, and four out of eight working in other parts of the department, had easily detectable penicillin in their nares after a morning's work. Whether this penicillin had been inhaled from the air or introduced by contaminated fingers cannot yet be told.

Nasal Carrier-rate of Staph. aureus *among Staff of Outpatient Department*

The carrier-rate exceeded 60%, and all the doctors and nurses who were carriers harboured penicillin-resistant strains (table II). The number of colonies of *Staph. aureus* isolated from carriers from whom detectable penicillin was recovered from the nares was significantly less than in those carriers who had no detectable penicillin in their nares.

EXPERIMENTAL CONTAMINATION OF A ROOM WITH PENICILLIN

Experiments were made in laboratory rooms to show that the air and dust can be contaminated when penicillin preparations are used and handled, as they were in the outpatient department of this hospital. A hard surface was contaminated by spilling, dropping, and squirting penicillin solution (sodium benzyl penicillin) and suspensions (procaine penicillin) in concentrations calculated to simulate those that would be used during the preparation and giving of penicillin injections and the washing out of the penicillin-contaminated syringes.

TABLE III—RECOVERY OF PENICILLIN IN A ROOM CONTAMINATED BY 100,000 UNITS OF PROCAINE PENICILLIN

—	Time after contamination or reagitation (min.)*	Penicillin settling on indicator plates of 12 sq. in. area per hour at 5 metres distance from source of contamination (μg.)	Penicillin content of 100 c.ft. of air by sieve sampling (μg.)
Before contamination	—	0	0
After initial contamination	1–5	2·0–5·0	10·00
	6–10	0·32	4·00
	11–15	0·11	2·00
	16–20	0	1·50
	21–25	0·02	0·05
	26–30	0	0
After reagitation ..	1–5	5·0	5·00
	6–10	0·6	3·20
	11–15	0·1	1·10
	16–20	0·2	Trace
	21–25	Trace	0
	26–30	0	0
	30–40	Trace	0

* Smooth surface of a piece of hardboard 4ft by 3ft contaminated with penicillin. Reagitation after drying by striking ten times on the undersurface.

The preparation of an injection of penicillin usually involves adding a few millilitres of water to a phial of dry penicillin, and a solution or a suspension containing 300,000–600,000 units of penicillin per ml. is sucked up into a syringe. Our observations indicate that about 0·2 ml. remains in the syringe and needle after the injection, equivalent to 60,000–120,000 units, and this amount is diluted to various degrees by cleaning the syringe.

Measurements were made before and after the contamination procedures by exposing indicator plates and sieve sampling. After the contaminated surfaces had dried, dust was raised by agitation, and measurements were continued. The results (table III) showed that a previously penicillin-free room was contaminated, and exposed indicator plates and sampler plates showed zones of inhibition of growth comparable with those obtained in the hospital environment. The frequency of occurrence of particles of different calculated sizes corresponded to those found in hospital, and a greater proportion of large particles were detected on the settling plates than on the sampler plates (fig. 2).

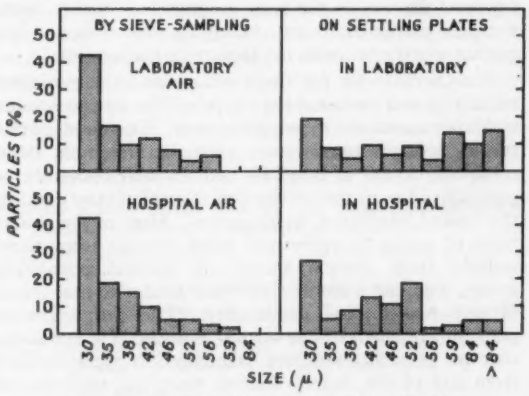

Fig. 2—Distribution of sizes of penicillin particles.

Direct observation of the particles of penicillin in suspensions and crystals formed during evaporation of solutions showed that the size distribution corresponded to the distribution observed in hospital and in the contaminated laboratory room for particles of 30 μ or more. There were many particles smaller than 30 μ, but these are too small to be detected individually on the indicator plates. This seems to confirm that it was the particles and crystals from the penicillin preparations which contributed most to the contamination of the hospital environment (fig. 2).

If the air in the contaminated room remained still and there was no further activity, the amount of penicillin recovered on settling plates and by sieve-sampling rapidly became less with time until after 25 minutes it was exceptional to recover any penicillin. Disturbance of the air and dust produced recirculation of penicillin-contaminated particles, and these could be recovered for a further 20–25 minutes, depending on the degree and continuance of agitation. This is to be expected from the relatively large size of the penicillin particles involved, because those larger than 25 μ will settle to the ground and other surfaces in a matter of a few seconds (Duguid 1946).

TABLE IV—NASAL CARRIAGE OF *Staph. aureus* AMONG STAFF OF FACTORY AND CONTROLS OUTSIDE FACTORY; CHARACTERISTICS OF THE CARRIER STRAINS; AND AMOUNT OF PENICILLIN RECOVERED FROM FACTORY ENVIRONMENT

Group	No. of persons	Carriers of *Staph. aureus* (%)	Average no. of staphylococci on nose swabs	Carrier strains (%)				Penicillin recovered from 100 c. ft. samples of air	Penicillin on fomites	Penicillin in nares or on hands of staff
				Penicillin-resistant	Phage group					
					I	II	III			
Penicillin filling-rooms and packing-rooms	44	9	+	100	25	0	75	Filling-room 10–250 μg. Packing-room 2–30 μg.	Large amounts	Present in those examined
General packing-room (no penicillin handled)	32	27	+++	100	36	0	60	Small amounts of penicillin (variable amounts of other antibacterial agents)	Not tested	Not tested
Office	28	32	+++	100	30	0	70	Traces of penicillin	Not tested	Not tested
General population outside factory	36	30	+++	12	27	64	9	Not tested	Not tested	Not tested

EXAMINATION OF FACTORY AND FACTORY PERSONNEL

The staff of this factory were first examined for nasal carriage of *Staph. aureus* and for this were divided into three groups: (1) those working in contact with penicillin; (2) those working in the factory but not with penicillin; and (3) administrative staff working in a separate building and not coming into continuous contact with the factory itself. At the same time a fourth group, of persons from a general practice in the same geographical locality, were similarly examined, being chosen because they had no contact whatsoever with the factory or its personnel.

The carrier-rates for these groups and the penicillin sensitivity and bacteriophage type of the carrier strains of *Staph. aureus* are shown in table IV. The nasal-carrier strains isolated from factory personnel resemble those commonly found in hospitals both in their resistance to penicillin (due to the production of penicillinase) and in the limited number of types present. Most of the strains were of group-III types and quite distinct from those isolated from carriers among the general population group, who had a nasal carrier-rate similar to that found in any non-hospital community. The proportion of penicillin-resistant strains was also normal. It is significant that no penicillin-sensitive staphylococci were isolated from any of the factory staff or from the environment examined. It is also noteworthy that only small numbers of microorganisms were isolated from the nares of persons working in close contact with penicillin, and this is correlated with a very low carriage-rate of *Staph. aureus* among such persons. Penicillin was detected on the fingers and in the nares of those working in the penicillin filling and packing rooms.

The next experiment was to measure the penicillin content of the air at various sites in the factory. The results are shown in table IV. Appreciable amounts of penicillin were recovered from the air in several parts of the main factory building, where penicillin was dispensed or handled, and much smaller amounts where other drugs were handled. Only traces of antibacterial activity were detected in the air of the administrative building.

The concentration of penicillin in the air of the penicillin filling-room and packing-room appeared to be sufficient to depress a growth of all bacteria in the nares of persons working there, and the strains of staphylococci isolated all produced penicillinase. Small amounts of penicillin were recovered from the air of other parts of the factory, which, though insufficient to depress the growth of nasal flora, was adequate to select and maintain penicillin-resistant strains of *Staph. aureus*. Although little penicillin could be detected in the air of the administrative block, probably traces of penicillin would reach this site by air and in dust and on the clothing and fingers of members of staff. Thus penicillin could be transferred to their nares and be effective in maintaining strains of penicillin-resistant staphylococci.

Discussion

It is clear from these observations that penicillin was found in highest concentration in the environment where it was being used. In the dispensaries, hospital wards, and outpatient departments of this hospital the handling of penicillin-containing phials and syringes seems to be the more important source. Leakage from the phial during puncturing, clearing of air bubbles and froth from syringe and needles, and spraying when washing out the syringe commonly takes place during the process of injecting a patient. Other sources are as obvious, such as insufflation of the wounds with penicillin and the use of other topical preparations of the penicillin. Some are not so obvious, such as the spilling of urine containing penicillin from a treated patient. Air may therefore be contaminated in two ways: directly, by droplet nuclei, which are the dried residue of droplets atomised from syringes and the like; and indirectly, by the raising of dried spilt penicillin as dust.

The hospital environment can therefore readily acquire penicillin, and the amount may be cumulative because destruction of the dried penicillin in dust may be relatively slow, and the penicillin would continually be redistributed through disturbances of dust and air and the handling of articles. Appreciable amounts of penicillin have been shown to gain access to the nares of persons working in the hospital environment, and without doubt this will inhibit the growth of penicillin-sensitive strains of *Staph. aureus*. Such persons will be continually exposed to recontamination with staphylococci from the environment, the great majority of which in hospital will be penicillinase-producing strains. Penicillin-resistant strains will therefore find it easy to establish themselves (Clarke 1957) and to colonise the nares of a larger number of persons in hospital than in other environments which do not contain penicillin and where the nares of most carriers are colonised with penicillin-sensitive *Staph. aureus*.

Thus the predominance of penicillin-resistant *Staph. aureus* in carriers in a closed community such as a hospital is explained, as also is the fact that the longer the period of exposure to the hospital environment the greater is the chance of becoming colonised with penicillin-resistant organisms (Barber et al. 1949, Cairns and Summers 1950, Rountree and Barbour 1951, Vogelsang and Bøe 1952, Lepper et al. 1953, Hutchison et al. 1957. Carriers among the general population are not affected, because they would have little chance of accumulation of

penicillin in their homes and little chance of cross-infection with resistant strains of staphylococci.

If environmental penicillin is important in maintaining penicillin-resistant staphylococci in this way, one would expect that any community exposed to environmental penicillin, as distinct from therapeutic administered penicillin, would have a higher incidence of penicillin-resistant strains. That this is so is clearly shown in the results obtained in the examination of the penicillin factory, where persons exposed to environmental penicillin but not to administered penicillin had as high a resistance-rate of *Staph. aureus* as had hospital personnel. Therefore, it can be concluded that environmental penicillin is an important factor in the widespread colonisation of hospital carriers with penicillin-resistant strains of *Staph. aureus*.

Restriction in the use of penicillin and avoidance of contamination of the environment might therefore be expected to reduce colonisation of carriers with penicillin-resistant strains and therefore to reduce spread to patients, with a consequent decrease in the number of infections with penicillin-resistant organisms.

Staphylococci resistant to other antibiotics also occur in hospital in proportion to the amount of these drugs used (Clarke et al. 1952), and possibly contamination of the environment with these antibiotics is related to the prevalence of resistant strains in the same way as with penicillin. In support of this is the evidence that restricted use of chloramphenicol (Kirby et al. 1953), streptomycin (Needham and Nichols 1953), and erythromycin (Lepper et al. 1953) in hospital is associated with a reduction in the number of strains of *Staph. aureus* resistant to these antibiotics.

Summary

Penicillin was detected in the environment in a general hospital. The amount recovered in different parts of the hospital varied considerably but was greatest nearest those rooms where penicillin was being handled or therapeutically administered.

Particles of the pencillin directly contaminate air, dust, and fomites. The noses of carriers of *Staph. aureus* are contaminated by inhalation and transference from hands and fingers, and this provides a concentration of penicillin adequate to inhibit penicillin-sensitive *Staph. aureus* and leaves the nares free for colonisation with penicillin-resistant strains which abound in the hospital environment.

The environment of a factory handling penicillin was similar to that of the hospital in that it contained penicillin and all the carrier strains of *Staph. aureus* were penicillin-resistant.

It was concluded that environmental penicillin is an important factor in the colonisation of hospital nasal carriers with penicillin-resistant *Staph. aureus* and in the cross-infection of persons receiving or not receiving therapeutic antibiotic.

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RECEPTORS IN THE HIGH-PRESSURE AND LOW-PRESSURE VASCULAR SYSTEMS

THEIR ROLE IN THE REFLEX CONTROL OF THE HUMAN CIRCULATION

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THE importance of the carotid-sinus and aortic-arch baroreceptors in the reflex regulation of the circulation has been recognised since the classical experiments of Heymans (Heymans et al. 1933). Besides these receptors in the high-pressure vascular system many receptors have been described in the walls of low-pressure vascular components, especially the right and left atria and the intrapericardial portions of the superior and inferior venæ cavæ (Nonidez 1941, Paintal 1953). Neil and Zotterman (1950) and Paintal (1953) described afferent vagal impulses which appeared to be related to the atrial pressure cycle, but the effect of these impulses on cardiovascular activity remains obscure. Evidence has been presented that activity of this type of receptor may affect heart-rate (Bainbridge 1915, Coleridge and Linden 1955), vasomotor tone (Brigden and Sharpey-Schafer 1950, Roddie et al. 1957a), and output of urine (Henry et al. 1956a, Love et al. 1957).

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We review here the results of recent experiments designed to elucidate in man the interrelationships between the high-pressure and the low-pressure receptors, with special reference to the control of vasomotor tone in the limbs.

Methods

The experiments were carried out on young healthy male adults. Blood-flow in the hand, forearm, or calf was measured by venous-occlusion plethysmography. Intravascular and intrathoracic pressures (Dornhorst and Leathart 1952) were measured by capacitance manometry. In some experiments deep and superficial forearm veins were catheterised (Roddie et al. 1956), and the oxygen saturation of blood sampled from these veins was estimated by a spectrophotometric technique (Roddie et al. 1957b). In certain circumstances changes in the oxygen saturation of blood from these veins can indicate changes in muscle and skin blood-flow respectively. In other experiments the nerves to the forearm and hand were blocked by infiltrating the tissues round the ulnar median and radial nerves at the elbow with 2–3 ml. of lignocaine with adrenaline 1 : 50,000 (Roddie et al. 1957c).

Results

Role of Receptors in High-pressure System

The activity of the stretch receptors in the carotid-sinus area can be conveniently changed by compression of the common carotid arteries below the carotid sinus (Roddie and Shepherd 1957) and by applying suction to the neck area (Ernsting and Parry 1957). These procedures respectively decrease and increase the pressure across the artery walls in the carotid-sinus region. Fig. 1a shows some of the effects of compressing the common carotid arteries: the mean pressure at the carotid sinus is about halved, and the pulse-pressure transients are almost abolished; this is accompanied by an increase in systolic, diastolic, and mean pressure in the brachial artery, an increase in heart-rate, and stimulation of respiration. These are the classical changes and are consistent with decreased activity of the carotid-artery stretch receptors.

There is no evidence, however, that the pressor response to carotid compression is even in part due to a reduction in the calibre of the limb blood-vessels. The blood-flow through the hand and forearm is slightly increased, and this small increase can be explained by the increase in the perfusion pressure. Resistance to blood-flow in the limbs, calculated by dividing mean perfusion pressure (mean arterial minus mean venous pressure) by mean blood-flow is either unchanged or slightly decreased. Similarly Ernsting and Parry (1957) have shown that, during the hypotensive response to an increase in effective blood-pressure at the carotid sinus, there is no evidence for an increase in the calibre of the limb blood-vessels.

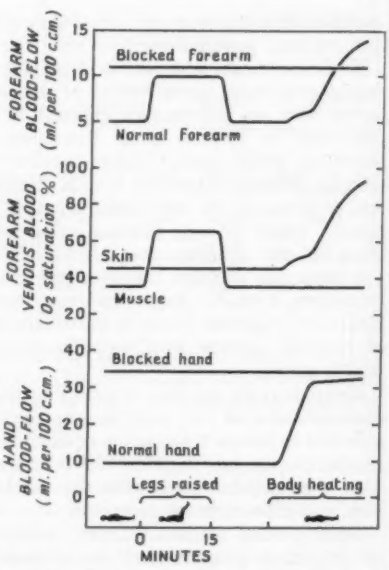

Fig. 2—Comparison of effects of passive raising of legs of recumbent person and of body heating on blood-flow through normal and nerve-blocked hands and forearms, and oxygen saturation of blood from superficial forearm vein (draining mainly skin) and deep forearm vein draining mainly muscle).

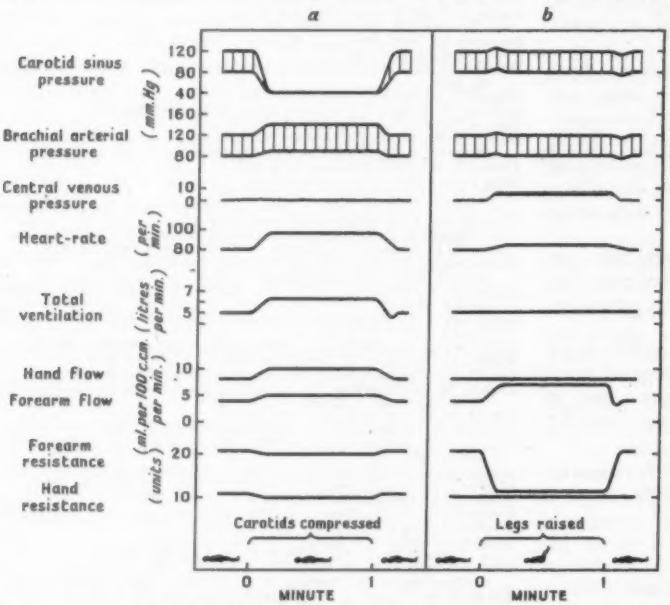

Fig. 1—Comparison of effects of (*a*) compression of a common carotid artery and (*b*) passive raising of legs of recumbent person on carotid sinus, brachial arterial and central venous blood-pressure, heart-rate, total ventilation, hand and forearm blood-flow, and vascular resistance in hand and forearm.

It therefore seems clear that changes in blood-pressure produced by stimulation of the carotid sinus are not due to changes in vascular resistance in the limbs and must be due either to changes in cardiac output or to changes in resistance in other vascular beds, or to both. Since both muscle and skin in the limbs are richly supplied with sympathetic fibres (Lewis and Pickering 1931, Barcroft et al. 1943, Roddie et al. 1957c), the failure of the limb vessels to participate in the reflex changes that follow stimulation of the carotid sinus is not a consequence of poor vasomotor innervation.

Role of Receptors in Low-pressure System

Large changes in forearm vascular resistance take place when body posture is changed (Brigden et al. 1950, Roddie and Shepherd 1956).

An example of this type of response is shown in fig. 1b. When the legs of a recumbent person are passively raised, the forearm blood-flow increases. This increase is due to vasodilatation since the perfusion pressure is usually unchanged and sometimes even decreased. The vasodilatation is brought

about reflexly since it is not seen in the nerve-blocked or the sympathectomised forearm (fig. 2). This reflex fall in forearm vascular resistance is due to the shift of blood from the capacity vessels of the legs to the intrathoracic vascular bed since no change in resistance takes place if the return of blood from the legs is prevented by inflation of pneumatic cuffs round the thighs. The shift of blood which takes place on raising the legs causes an increase in central venous pressure and in the amplitude of the venous pulsations (fig. 1b) but no consistent change in either mean arterial or pulse pressure. The greater the volume of blood shifted to the intrathoracic vascular bed the bigger is the rise in venous pressure and the larger the forearm vasodilatation. Since it is impossible to correlate the changes in arterial mean or pulse pressure with the magnitude of the forearm vasodilatation, this finding provides further evidence that the reflex changes in vascular resistance in the limbs that take place with change in posture are not the result of arterial baroreceptor activity but are more probably a consequence of stimulation of receptors in a low-pressure area of the intrathoracic vascular bed.

Other experiments which alter the transmural pressure in the intrathoracic vascular bed also cause reflex changes in forearm vascular resistance. During negative-pressure breathing (−15 mm. Hg), which lowers the intrathoracic pressure and thus increases the vascular transmural pressure, the forearm vascular resistance falls (Blair et al. 1958). When the receptors in the low-pressure area of the intrathoracic vascular bed are subjected to repetitive stretching brought about by rapid alternating positive and negative intrathoracic pressure changes, very large falls in forearm vascular resistance are reflexly produced (Roddie et al. 1958). In this way trebling or quadrupling of forearm blood-flow can be obtained.

It has been shown that the stretch receptors in the carotid sinus of the cat are affected not only by changes in mean pressure but also by changes in the amplitude of the pulse-pressure transients (Ead et al. 1952). It was found that the receptors responded more to the act of stretching than to a constant stretch. The present findings suggest that the same may be true for the low-pressure receptors.

Efferent Vasomotor Pathway in Low-pressure Vascular Reflex

The reflex vasodilatation which takes place during stimulation of low-pressure vascular receptors is seen in the forearm but not in the hand (fig. 2). Further, if the oxygen saturation of muscle and skin venous blood in the forearm is compared during such stimulation, it is found that the oxygen saturation of the muscle venous blood is increased, whereas that of the skin blood is unchanged (fig. 2). On the assumption that the metabolic requirements of the tissues remain unchanged the result indicates that the vasodilatation is taking place deep to the skin, presumably in muscle vessels only. Therefore, though the vessels of the forearm and hand skin have a rich vasomotor innervation, they do not take part in the reflex changes caused by stimulation of the low-pressure receptors.

The sympathetic fibres to skin are involved in the vasodilatation in the forearm and hand when the body temperature is raised (fig. 2). The vasomotor fibres to muscle play no part in this response (Barcroft et al. 1955, Edholm et al. 1956a, Roddie et al. 1956). Though in the hand present evidence suggests that the vasodilatation with body heating is brought about solely by release of vasoconstrictor tone (Arnott and Macfie 1948, Gaskell 1956, Roddie et al. 1957f), that in the forearm skin is predominantly due to the cholinergic sympathetic nerves, whose activity causes vasodilatation (Edholm et al. 1956b, Roddie et al. 1957e). There is evidence, however, that the vasodilatation in forearm skin with body heating may be the result of secretomotor rather than of true vasodilator nervous activity (Fox and Hilton 1956, 1957). These workers suggest that during sweat-gland activity a bradykinin-forming enzyme is produced in skin, and that the resultant formation of bradykinin (a polypeptide with vasodilator properties) contributes to the vasodilatation in skin during body heating.

The blood-vessels of human skeletal muscle are supplied with vasoconstrictor nerves (Barcroft et al. 1943, Roddie et al. 1957c), and there is evidence that they also have a vasodilator nerve-supply (Barcroft et al. 1944). However, the vasodilatation that can be obtained with low-pressure receptor stimulation is not greater than that produced by full release of vasoconstrictor tone produced by nerve block (fig. 2). Further, since blocking the activity of cholinergic vasodilator fibres in the forearm with atropine is without effect on the reflex changes (Roddie et al. 1957a), probably the changes in muscle-vessel calibre resulting from low-presure receptor activity are brought about by alterations in vasoconstrictor tone.

Discussion

The interrelationships of all the receptor mechanisms concerned in the reflex regulation of the circulation are complex, and the individual components which go to make up the final responses are difficult to analyse with precision. However, we can now define at least three types of reflexes, each utilising a different component of the autonomic nervous system on the efferent side, presumably by activation of different centres in the brain:

(1) One of these centres receives impulses from the low-pressure vascular receptors and causes changes in vascular resistance in skeletal muscle.

(2) A second centre receives impulses from the arterial baroreceptors and causes changes in blood-pressure and heart-rate but does not affect resistance to blood-flow in muscle or skin.

(3) A temperature-regulating vasomotor centre which utilises vasomotor fibres to skin only.

Conditions which lead to changes in cardiac output—e.g., exercise and postural change—are normally associated with changes in venous return and hence the degree of stretch of the vascular walls on the right side of the heart. An increase in cardiac output in these conditions without change in peripheral resistance would raise the arterial blood-pressure. This would lead not only to a large increase in the cardiac work but also to a reflex slowing of the heart due to stimulation of the arterial baroreceptors (Marey's law). Thus the receptors in the low-pressure side of the circulation would allow a large increase in cardiac output without a large increase in cardiac work and without reflex bradycardia.

A sudden increase in blood volume also increases cardiac output (McMichael and Sharpey-Schafer 1944). Possibly the receptors in the low-pressure area allow this increase to take place without much change in arterial pressure, the increase in venous return causing peripheral vasodilatation. This type of stimulus also causes a diuresis, and there is evidence that the receptors responsible for

this also lie in the low-pressure area, probably in the walls of the left atrium (Henry et al. 1956a). It is likely that both the circulatory and renal responses are concerned in the normal adaptations of the body to increased blood volume. It has often been suggested that vasomotor regulation of the capacity blood-vessels must play a part in the adaptation of the circulation to changes in blood volume, but evidence is accumulating that normally there is little nervous control of the capacity system in human limbs (Greenfield and Patterson 1956, Coles and Patterson 1957, Coles et al. 1957).

There are numerous accounts of nervous reflex activity in isolated venous segments (Duggan et al. 1955, Burch and Murtadha 1956). However, this type of result does not imply that total vascular capacity can be adjusted reflexly to any significant extent. For example, it has been claimed that isolated venous segments show strong reflex vasoconstriction when the blood-pressure is lowered at the carotid sinus (Salzman 1957). However, the pressor response to carotid-artery compression in man is not accompanied by any increase in central venous pressure; nor is there any reduction of the total amount of blood contained in the limbs (Roddie and Shepherd 1957). This suggests that, as a whole, the capacity system was not showing any significant response to this type of stimulus.

The precise location of the low-pressure receptors in the intrathoracic vascular bed concerned with reflex regulation of vasomotor tone in muscle is not known; nor is the exact nature of the stimulus. Though most stimuli which cause reflex peripheral vasodilatation are associated with an increase in the transmural pressure in the low-pressure vascular components (e.g., feet-up tilt and negative pressure breathing) they also increase amplitude of the venous pulsations caused by the cardiac cycle (Henry et al. 1956b, Roddie et al. 1957a). Therefore repeated acts of stretching of these receptors by pulsations may be a more effective stimulus than is a single constant stretch. This suggestion is supported by the fact that a very large peripheral vasodilatation is caused by alternate positive and negative changes in intrathoracic pressure. With this stimulus the low-pressure system is subjected to repeated very large artificial pulsations, but the mean transmural pressure is little altered (Roddie et al. 1958). It has also been shown that a greater diuresis can be obtained in a healthy person with pulsatile changes in intrathoracic pressure than with a steady change of intrathoracic pressure of similar magnitude (Love et al. 1957).

In congestive cardiac failure the transmural pressure in the low-pressure system is greatly increased, yet a further increase, brought about by postural change, does not cause peripheral vasodilatation; in fact peripheral vasoconstriction is the usual finding (Brigden and Sharpey-Schafer 1950). Furthermore, congestive failure is usually associated with a decrease in urinary output rather than an increase. Perhaps pulsatile pressure-changes in the low-pressure system cause less deformation of the receptors when the vessels are grossly engorged and distended with blood than do similar pressure-changes when the vessels are only moderately full. If this were so it might partly explain the anomalous circulatory reflexes and the antidiuresis commonly seen in congestive failure. However, it is clear that the manner in which these receptors are stimulated is complex and cannot be explained by transmural pressure-changes alone.

It is somewhat surprising, in view of the central place that the arterial baroreceptors have held in cardiovascular regulation, that the contribution of cardiac-output and peripheral-resistance changes to the changes in blood-pressure with arterial baroreceptor stimulation is, both in man and in animals, still a matter of controversy (Charlier and Philippot 1947, Kenney et al. 1951, Aviado and Schmidt 1955, Brind et al. 1956). Vasoconstriction in the less vital vascular beds, such as the splanchnic area, may result from changes in arterial baroreceptor activity, but this is not so in the limbs. Decreased activity of these receptors does not therefore divert blood from the limbs to the more vital structures. It is clear, however, that a fall in arterial blood-pressure reflexly stimulates the heart, and perhaps the chief function of this is to increase cardiac output when the output begins to fall dangerously.

Summary

Evidence is presented which demonstrates the importance of the receptors in the low-pressure vascular system in the reflex regulation of the circulation in man.

Alterations in the activity of these receptors causes changes in the amount of vasoconstrictor tone in blood-vessels supplying skeletal muscles.

By reflexly reducing resistance to blood-flow through skeletal muscles in this way, large increases in cardiac output can take place without a large rise in arterial pressure and hence without the large increase in cardiac work which would otherwise result.

Preliminary experiments suggest that repeated stretching of these receptors may be a more effective stimulus than is a constant stretch.

Changes in the activity of carotid-sinus stretch receptors cause reflex changes in blood-pressure and heart-rate but do not affect resistance to blood-flow in muscle or skin.

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CHLORPHENIRAMINE MALEATE IN PROPHYLAXIS OF PYREXIAL REACTIONS DURING BLOOD-TRANSFUSIONS

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THE use of anti-histamines in the prophylaxis of pyrogenic reactions to blood-transfusion has recently received considerable attention. Many workers have offered evidence that anti-histamines were effective in this respect (Ferris et al. 1952, Frankel and Weidner 1953, Offenkrantz et al. 1953, Simon and Eckman 1954, Stephen et al. 1955). The opposite conclusion, however, was reached by Winter and Taplin (1954), and Wilhelm et al. (1955).

It was therefore decided to conduct a controlled trial at the Middlesex Hospital with 200 blood-transfusions. In 100 of these transfusions the blood contained an anti-histamine. The incidence of pyrogenic reactions in each group was assessed.

Choice of Anti-histamine

Chlorpheniramine maleate ('Chlor-trimeton' in the U.S.A., 'Piriton' in Great Britain) was selected. Reference to the literature suggests that it is a powerful anti-histamine with few side-effects (Bernstein and Klotz 1952), and that the small dose of 10 mg. in each bottle of blood is adequate (Frankel and Weidner 1953, Offenkrantz et al. 1953, Simon and Eckman 1954, Winter et al. 1954, Loew 1950, Wright 1950). Ferris et al. (1952) were unable to confirm Baratta's (1950) impression that oral or subcutaneous administration was effective, and advised adding the material to the blood. Offenkrantz et al. (1953) showed that the mixture of blood and chlorpheniramine is stable.

TABLE I—ANALYSIS OF PATIENTS IN CONTROLS AND PIRITON SERIES

		Controls	Piriton
No. of patients		61	65
No. of patients in each age-group (yr.):			
15–29		4	4
30–44		13	16
45–59		20	16
60–80		24	29
ABO and rhesus blood-group:			
O	Rh+	27	24
A	Rh+	20	20
B	Rh+	3	6
AB	Rh+	2	2
O	Rh−	4	6
A	Rh−	5	5
B	Rh−	0	2
AB	Rh−	0	0
Sex:			
Male		29 (*48%*)	37 (*57%*)
Female		32 (*52%*)	28 (*43%*)

Plan of Trial

The scope of the trial was limited by the consideration that only one person should be responsible for adding chlorpheniramine to the blood and for the assessment of every case. To ensure as wide a cross-section of patients as possible, the trial was applied to patients from three medical and two surgical wards and to the department of radiotherapy.

An entirely objective assessment of whether or not a pyrogenic reaction took place was considered essential, and this assessment was based on half-hourly oral temperatures starting before transfusion and continuing till two hours after the completion of the transfusion or until any pyrexia had regressed (Mollison 1951).

All patients receiving transfusions in the selected wards were included in the trial, except where the following contraindications applied:

(1) Pre-transfusion temperature above 99·4°F.
(2) Age less than 15 or more than 80.
(3) Physical condition too poor to justify the burden of half-hourly temperature readings.
(4) Abnormal mental condition with impaired cooperation.
(5) Urgency of the transfusion.
(6) Within twenty-four hours of an operation.

TABLE II—DISTRIBUTION OF PATIENTS IN TWO SERIES BY ABO BLOOD-GROUP COMPARED WITH GENERAL POPULATION

ABO Blood-group	Incidence (%)		
	Controls	Piriton	Figures for general population of Britain (Dobson and Ikin 1946)
O	51	46	46·68
A	41	39	41·72
B	5	12	8·56
AB	3	3	3·04

From the actual figures of incidence of the blood-groups given in table I and from the expected values calculated from Dobson and Ikin's figures (amalgamating B+AB to avoid very low figures) $\chi^2 = 1{\cdot}76$, $n = 4$, and $0{\cdot}80 > P > 0{\cdot}70$.

Allocation to control and piriton groups was alternate, except that multiple transfusions of the same patient were allotted alternately to either group.

The following data were collected:

Hospital number, name, age, and sex. Diagnosis, and a clinical summary including reason for transfusion. Past transfusion history, especially as regards reactions of any kind. Past history of allergy. Hæmoglobin concentrations before and after each transfusion, and the ABO blood-group and rhesus factor of recipient and donor (the blood-groups being identical except in one transfusion).

On the temperature chart was marked the time at which each bottle was begun and finished, the date of origin and identification number of the bottle, and any comment of the nurses about symptoms and signs of "reaction" during the transfusion. No attempt was made to divide reactions into those with and those without rigor, because Mollison (1951) has pointed out that rigor may depend on external factors. Instead, an arbitrary division was made into three groups as follows:

(1) Temperature reaches 100°F but not 101°F.
(2) Temperature reaches 101°F but not 103°F.
(3) Temperature reaches or exceeds 103°.

All the patients were asked by me about symptoms during the transfusion, with special reference to those that might have been either side-effects of chlorpheniramine or due to pyrexia.

The resultant data, in so far as they are relevant to this article, are analysed below.

TABLE III—MULTIPLE TRANSFUSIONS

No. of transfusions	No. of patients who had more than one transfusion in either series	
	Controls	Piriton
2	10	11
3	5	5
4	2	3
5	1	0
6	0	1
7	0	0
8	0	0
9	1	0
Total	57	55

TABLE IV—ANALYSIS OF TRANSFUSIONS IN CONTROLS AND PIRITON SERIES

	Controls	Piriton
Average no. of bottles per transfusion	2·43	2·49
ABO and rhesus blood-group of patient in each transfusion:		
O+	42	36
A+	29	33
B+	7	10
AB+	4	2
O−	13	10
A−	5	8
B−	0	1
AB−	0	0
Total	100	100

Results

No side-effects of chlorpheniramine were observed except moderate drowsiness in three patients.

The control and treatment groups have been analysed for comparability in tables I–IV, which show that, as regards age, sex, and blood-group (table I), the groups do not significantly differ. Neither series shows a distribution of blood-groups which differs significantly from that for the general population (table II). Table III presents details of multiple transfusions in each group. The patterns of distribution are similar. Table IV analyses the two groups as transfusions rather than as individuals, and shows an essential similarity between the two groups as regards average volume of transfusion and blood-group of the patient in each transfusion.

Table V presents the incidence of pyrogenic reactions in control and treatment series. Grade-3 reactions took place with almost the same frequency irrespective of whether or not the blood contained the anti-histamine. Neither the small difference in incidence in the grade-1 pyrexias nor the overall incidence for all three grades is significant.

Discussion

The overall incidence of transfusions associated with pyrogenic reactions was 35%, whereas the incidence-rate given in published reports is usually 3–6%. There appear to be four possible reasons for this discrepancy:

(1) For the assessment of the incidence of pyrogenic reactions most investigators have relied on taking a history from the patient the day after transfusion and upon the reporting by the nurses of a chill-fever reaction. The present trial has shown, however, that often a patient can develop a pyrexia of 101° or 102°F without any sign to attract the attention of the nurses, and even without any symptoms to recount on direct inquiry the next day.

The opposite discrepancy, though much less common, was also observed. A few patients claimed to have "felt feverish" during the transfusion, though their temperature never reached 100°F.

(2) Some of these pyrexias will have been coincident with, but not caused by, the blood-transfusion. No effort was made to exclude from the trial any patient who, because of his complaint, would be likely to develop a temperature, so long as he was apyrexial at the start of the transfusion. Degrees of liability to have pyrexia would have been difficult to assess and to control. However, most published reports do not mention that such patients have been excluded; so this factor is unlikely to be a major cause of the discrepancy.

TABLE V—INCIDENCE OF PYROGENIC REACTIONS

Grade of pyrexial response	No. of pyrogenic reactions in groups according to maximum temperature	
	Controls	Piriton
1, reaching 100°F but not 101°F	23	17
2, reaching 101°F but not 103°F	10	9
3, reaching or exceeding 103°F	5	6
Total	38	32

Difference in total incidence = 6%. Standard error of the difference = 6·73%.
For the grade-1 responses:
Difference in incidence = 6%. Standard error of the difference = 5·61%.
Neither difference is statistically significant.

(3) In all grade-2 and grade-3 reactions hæmolysis due to blood-group incompatibility was excluded by the appropriate investigations.

(4) An excessive incidence of pyrogens in the transfusion apparatus was unlikely because the thermal reactions were evenly spread over the twelve months of the trial, and because no case of pyrexia associated with electrolyte infusion alone was reported to me during this time.

If a true incidence of pyrexia during transfusion of 35% has been assessed by previous investigators at 5%, it is not surprising that the apparent efficacy of any agent in reducing the incidence varies widely from series to series. Moreover, no published reports include an analysis of their control and treatment groups for comparability. Particularly important in this connection is the factor of multiple transfusions. One or other group may by chance be loaded with a few patients specially susceptible to pyrexia, either because of their illness or because they are sensitive to transfused blood (Dameshek and Neber 1950). This source of error has in the present series been controlled by the method of allocation, and table III suggests that the method was efficacious.

The results of this trial indicate that there is no justification for the routine prophylactic use of an anti-histamine in each bottle of transfused blood in an effort to prevent pyrogenic reactions. Even if the 6% (38–32%) difference between control and treatment groups for grade-1 reactions were repeated in a larger series and so became statistically significant, this would still not be an argument in favour of routine anti-histamine medication of the blood. The addition of any material to a bottle of blood must carry with it some danger of contamination, and this consideration would outweigh the avoidance of 6 minor thermal reactions in every 100 transfusions.

These conclusions do not apply in the particular instance of patients with a known history of allergy. Published reports agree that such patients are particularly liable to allergic reactions to blood-transfusion (e.g., Maunsell 1944), and that prophylactic anti-histamine medication of the blood reduces the incidence of allergic reactions almost to zero (Hoffman 1957). My experience is similar, and it is my custom to endeavour, where possible, to elicit a history of allergy in all patients about to be transfused. Where the history is positive, chlorpheniramine 10 mg. is added to each pint of blood.

Summary

A controlled trial was made to test the efficacy of an anti-histamine, chlorpheniramine maleate, in preventing pyrexial reactions during blood-transfusion.

No statistical evidence of such an effect was obtained.

This conclusion does not affect the validity of the practice of using chlorpheniramine 10 mg, in each bottle of blood for transfusion to all patients with a history of allergy, so as to reduce the incidence of allergic reactions.

My thanks are due to the blood-transfusion subcommittee of the Middlesex Hospital for permission to conduct this trial; and to Dr. J. W. Stewart, of the Bland-Sutton Institute of Pathology, for valuable technical assistance. The 'Piriton' was supplied by Messrs. Allen and Hanburys, Ltd.

References at foot of next column

PSYCHOSIS AND TREMOR DUE TO MECAMYLAMINE

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MECAMYLAMINE as a ganglion-blocking agent for treating hypertension was introduced two years ago (Freis 1955, Ford et al. 1955), and since then it has been widely used in clinical practice, its chief advantage being that it is fully and regularly absorbed when given by mouth. It produces the same side-effects, due to blockade of the parasympathetic system, as do other ganglion-blocking drugs, but in addition reports have been published in America indicating that mecamylamine may also have a toxic action on the central nervous system (Schneckloth et al, 1956, Deming et al. 1957).

We describe here four patients in whom tremor and mental disturbance, with confusion and hallucinations, developed while they were receiving mecamylamine, and we suggest that this may be a not uncommon complication of treatment with mecamylamine given in large dosage.

Case-reports

Case 1.—A man, aged 55, was first seen in July, 1955, complaining of headaches. He had two years' history of high blood-pressure and fifteen years' history of gout. Although intelligent, he was unstable and did not follow any regular occupation.

On examination his blood-pressure was 230/140 mm. Hg; he had numerous retinal hæmorrhages and exudates; his urine contained a trace of albumin and could be concentrated to 1·020; and his blood-urea level was 30 mg. per 100 ml.

Treatment.—Benign essential hypertension having been diagnosed, he was treated with subcutaneous pentolinium, to which reserpine 0·1 mg. thrice daily was later added. This regime reduced his blood-pressure, and his fundi considerably improved.

Mecamylamine therapy.—In July, 1956, mecamylamine was substituted for the pentolinium, 20 mg. thrice daily being necessary to keep the blood-pressure down to 140/80 mm. Hg, with the patient in the erect position, for the greater part of the day. This dosage, however, caused troublesome side-effects, at first principally constipation, but later difficulty in micturition associated with frequency.

Readmission.—In February, 1957, retention of urine developed and the patient was readmitted to hospital. His blood-urea level was now 60 mg. per 100 ml., rising after ten days to 72 mg. per 100 ml.; he had a urinary infection, which was treated with tetracycline. Soon after admission his requirement for mecamylamine fell: the dosage was reduced from 60 to 30 mg. daily, and his blood-pressure was maintained at 110/70 mm. Hg with the patient in the upright position.

Mental and nervous symptoms.—On Feb. 19, 1957, he had a tremor of the hands. All hypotensive treatment was stopped, but next day the tremor had increased and he became mentally confused. Two days later his condition had deteriorated further: he had a coarse generalised shaking affecting his whole body, present at rest, and accentuated on attempting any voluntary movement. His speech was slurred and jerky. There was a general increase in muscular tone and in the deep reflexes; the plantar responses remained flexor. He was completely disoriented in both space and time and had vivid frightening hallucinations. His extreme restlessness and picking at the bedclothes suggested alcoholic delirium tremens. From time to time he had lucid intervals during which he had considerable insight into his condition. Repeated large oral doses (10–15 ml.) of paraldehyde subdued the tremor and relieved the hallucinations for three to four hours at a time.

This striking clinical picture persisted for a week and then gradually subsided. By March, twelve days after the mecamylamine treatment had been stopped, the hallucinations had disappeared and the patient's mental state had returned to normal. He could now remember in detail what had happened during his delirium. Slight tremor persisted for a further two days before finally clearing. During this period he had been treated with subcutaneous pentolinium because his blood-pressure had risen after the cessation of hypotensive therapy; but it was difficult to keep his blood-pressure down, because he was confined to bed. He was discharged from hospital on March 14, 1957, taking two injections of pentolinium daily; his blood-urea level had fallen to 38 mg. per 100 ml.

Readmission.—Four months later he was readmitted with uræmia and left ventricular failure and died in five days.

Necropsy

There was atheroma of the blood-vessels at the base of the brain; the gyri were flattened, but no localised abnormality was found on section of the brain. The kidneys showed lesions of malignant nephrosclerosis.

Case 2.—A woman, aged 65, was admitted to hospital in July, 1956, with left ventricular failure. She had eight weeks' history of exertional dyspnœa. Her blood-pressure was 300/160 mm. Hg, and she had hæmorrhages and soft exudates in her fundi. Her blood-urea level was 30 mg. per 100 ml. She was treated with digitalis, mersalyl, and hypotensives—at first subcutaneous pentolinium and later oral mecamylamine. When first seen at Hammersmith Hospital in September, 1956, she was very much improved symptomatically, but her blood-pressure was 200/130 mm. Hg, and the dosage of mecamylamine was increased from 12·5 to 20 mg. twice daily. In October the dosage was further increased to 45 mg. daily; but, although this dosage did not control the hypertension, urinary retention developed and she was admitted to hospital on Oct. 29, 1956.

On admission she was cooperative and well oriented but somewhat apprehensive and overexcitable. Her blood-pressure was 290/140 mm. Hg, and soft exudates but no papilloedema were noted in her fundi. There was no sign of heart-failure. Her urine contained albumin, and her blood-urea level was 66 mg. per 100 ml. Mecamylamine therapy was continued, the dosage being slowly increased until on Nov. 6, 1956, she was having 65 mg. daily. Her systolic blood-pressure remained about 200 mm. Hg.

Mental and nervous symptoms.—In the early hours of Nov. 11, 1956, she became agitated and confused, having hallucinations of voices and complaining of noises in the head. Her blood-pressure was 170/90 mm. Hg. She had general hyperreflexia.

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During the succeeding days her confusion increased, and she was disoriented for most of the time but had intervals of insight and cooperation. Mecamylamine therapy was stopped on Nov. 13. On Nov. 17 she was grossly confused and hallucinated, with paranoid delusions. She also had a coarse tremor of arms and legs. Her blood-urea level had risen to 97 mg. per 100 ml. on Nov. 17 and to 140 mg. per 100 ml. on Nov. 20. She became more agitated and violent and was completely inaccessible. On Nov. 21 her condition made it necessary to transfer her to a mental observation ward. She went progressively downhill, her blood-urea level rose to 296 mg. per 100 ml., and she died on Nov. 30, 1956, without any improvement in her mental state.

Necropsy

The left kidney was small (55 g.) with generalised ischæmic atrophy suggesting occlusion of the renal artery. The right kidney weighed 110 g., and its histology was that of florid malignant nephrosclerosis. The brain showed a small area of softening in the right internal capsule, and the cerebral arteries were considerably affected by atheroma.

Case 3.—An electrical engineer, aged 53, was found in January, 1956, to have a blood-pressure of 240/140 mm. Hg, bilateral papillœdema, heavy albuminuria, and a blood-urea level of 40 mg. per 100 ml. Malignant essential hypertension was diagnosed, and he was treated with subcutaneous pentolinium and with rauwolfia alkaloids; but his blood-pressure was difficult to control, and during the next six months further deterioration in the fundi and increasing cardiac enlargement were noted.

On admission to Hammersmith Hospital in July, 1956, he had heart-failure, blood-pressure 260/140 mm. Hg, bilateral papillœdema, hæmorrhages and exudates in his fundi, and albuminuria. His blood-urea level was 139 mg. per 100 ml.

Treatment with subcutaneous pentolinium was continued, a dosage of 30–40 mg. twice daily being necessary to control his blood-pressure. Rauwolfia was not given. Chlorpromazine 50 mg. thrice daily was given because of vomiting. After a month the heart-failure had cleared and the blood-urea level fallen to 60 mg. per 100 ml.

Mecamylamine therapy.—On Sept. 10, 1956, mecamylamine therapy was started, and pentolinium was withdrawn gradually during the next few days. The blood-pressure was not satisfactorily controlled during the period of transfer, but by Sept. 17 it was down to 140/80 mm. Hg, with the patient in the erect position, for most of the day. This was achieved with a dosage of 20 mg. mecamylamine thrice daily. By now the blood-urea level had risen again to 100 mg. per 100 ml. The fundi still showed papillœdema, but there were no fresh exudates or hæmorrhages.

Mental and nervous symptoms.—On Sept. 24, 1956, shaking of the limbs and trunk was first noted. This tremor also affected the face and tongue; it was coarse and present at rest but exaggerated on voluntary movement. The speech was jerky and difficult to understand. There was a general increase in muscular tone; the tendon-reflexes were exaggerated, and knee and ankle clonus could be elicited; the plantar responses were flexor. Mecamylamine was withheld after it had been taken for fourteen days, and pentolinium therapy was restarted; but the tremor increased, and four days later the patient became drowsy and confused. He was now disoriented and hallucinated, speaking to imaginary people and seeing snakes and insects crawling across his bedclothes. His body shook so violently as to rock the whole bed. Paraldehyde reduced the tremor somewhat, but he remained confused and steadily deteriorated. His blood-urea level rose to 170 mg. per 100 ml., his urinary output fell, and he died, after repeated attacks of left ventricular failure, on Oct. 7, 1956.

Necropsy

The brain was overweight (1490 g.) and œdematous, with a small area of recent softening at the posterior end of the putamen on each side and a recent small hæmorrhage in the mid-pons. The kidneys were typical of malignant nephrosclerosis.

Case 4.—An electrician's mate, aged 46, presented in January, 1956, with four months' history of blurring of vision and dyspnœa. His blood-pressure was 250/150 mm. Hg and he had bilateral papillœdema with scattered retinal hæmorrhages. His urine contained albumin, granular casts, and occasional leucocytes; his blood-urea level was 155 mg. per 100 ml. There was no history to suggest previous renal disease. In view of his visual symptoms hypotensive therapy was considered advisable, in spite of the severe renal failure, and treatment was started with subcutaneous pentolinium. At the end of February his blood-urea level was 222 mg. per 100 ml.

Mecamylamine therapy.—At this stage he was given oral mecamylamine. He was not very sensitive to it, 60 mg. in divided doses daily being needed to keep his blood-pressure down to 160/100 mm. Hg. On April 14, 1956, six weeks after mecamylamine therapy had been started, he was readmitted to hospital with increasing trembling of his arms and legs for the previous three days. On admission his blood-pressure was 160/90 mm. Hg. He still had bilateral papillœdema. He was dyspnœic, and his jugular venous pressure was raised.

Mental and nervous symptoms.—He was drowsy and mentally confused. He had occasional spontaneous quivering of his lips and a coarse irregular tremor of his limbs. His muscular tone was increased; his lower limbs showed almost cogwheel rigidity. His tendon-reflexes were uniformly increased, and he had bilateral ankle clonus. His plantar responses were flexor. Hypotensive therapy was stopped, and he was treated only with digoxin, but the confusion and tremor persisted, and he died on April 16, 1956.

Necropsy

The kidneys showed the changes of malignant nephrosclerosis. The brain showed cerebral œdema, but no localised lesion or other abnormality.

Discussion

The clinical picture was similar in each of these four patients. In three the first neurological abnormality to be noted was a coarse tremor which affected the trunk and head as well as the limbs and caused difficulty with speech. It was variable in the early stages, perhaps hardly noticeable when a limb was at rest, but brought out when voluntary movement was attempted. The shaking of the trunk made it look as if the patient was shivering. The tremor was equally present on both sides of the body. At its height it was so violent in two patients as to shake the whole bed. Mental symptoms were observed before the tremor in one patient, but in the others a few days after the tremor. They consisted of a clouding of consciousness with confusion and disorientation, together, in three cases, with hallucinations which were usually visual but sometimes also of hearing or of touch. The mental state fluctuated, and there were lucid intervals, with some insight, between periods of extreme delirium. Both tremor and mental symptoms were alleviated temporarily by administration of paraldehyde, in case 1 strikingly so. In this patient, who recovered from the episode, the mental abnormalities disappeared first, the tremor persisting for a few days before finally clearing.

Examination of the nervous system in these patients revealed a general increase in muscle tone, symmetrically exaggerated tendon-reflexes with clonus, and flexor plantar responses. In no case were any lateralising signs found. Electroencephalography in three cases gave records which were difficult to interpret because of artefact due to muscle tremor; there was complete absence of alpha rhythm, but in no case was positive evidence found

either of a general metabolic disturbance or of a localised lesion.

The patients all had severe hypertension. In two this was frankly malignant, with papillœdema; in the other two the presence of active retinitis and progressive renal failure indicated that the hypertension was in a premalignant phase, and at necropsy lesions of malignant nephrosclerosis were found in the kidneys. Renal function was impaired in all. In three there was gross renal failure with a raised blood-urea level which continued to rise until death; in case 1, who already had some renal impairment, shown by a failure of concentrating power, but who had a normal blood-urea level, there was a further deterioration in renal function and a temporary rise in the blood-urea level coincident with a urinary infection. This patient's blood-urea level had returned to normal by the time that his neurological symptoms had cleared, but it rose again later, and uræmia was present at his death four months afterwards.

All four patients were receiving large dosages of mecamylamine (60–65 mg. daily) because smaller amounts had not reduced the blood-pressure. The duration of administration of mecamylamine before neurological symptoms developed varied from seven months in case 1 to fourteen days in case 3. Case 1 had the least impairment of renal function.

Since cerebral arterial disease is common in hypertensive patients, the question arises whether organic brain damage due to hæmorrhage or to infarction could have caused the symptoms observed. Evidence of local cerebral lesions was found at necropsy in two cases: in the right internal capsule in one case; and in both basal ganglia and the pons in the other. The whole clinical picture, however, was more like a toxic confusional reaction, bearing in its fully developed state a striking resemblance to alcoholic delirium tremens. The symmetry of the tremor, the absence of any lateralising signs in the central nervous system, and particularly the complete disappearance of symptoms in case 1 after mecamylamine had been withheld suggest strongly that this drug was to blame. In the patients who did not recover, uræmia and death supervened probably before sufficient time had elapsed to allow the mecamylamine to be cleared from the body.

Mecamylamine is a secondary amine and freely diffusible across cell membranes. There is evidence that this drug is concentrated within the cell (Milne et al. 1957). It is therefore likely that its mode of action differs from that of ganglion-blocking agents such as hexamethonium and pentolinium, which are quaternary ammonium compounds and are distributed only in the extracellular fluid. That mecamylamine has a different, and previously unrecognised, mode of action at the neuromuscular junction has been shown by Bennett et al. (1957). From this it might also be expected that mecamylamine, apart from producing the same side-effects due to parasympathetic blockade as other ganglion-blocking drugs, might also have toxic actions from which methonium compounds are strikingly free. There is some experimental evidence of a direct toxic action on the central nervous system. Rats given mecamylamine in large doses develop a tremor and have generalised convulsions before death (Milne et al. 1957).

The frequency of this complication of treatment is not certain. Doyle et al. (1956), Smirk and McQueen (1957) and Kitchin et al. (1957), in their accounts of clinical experience with mecamylamine, do not mention any neurological symptoms related to its administration. The four cases described here occurred among ninety patients treated with mecamylamine at this hospital (twenty of them with malignant hypertension). The average daily dosage of mecamylamine in the whole series, however, was only 35 mg., and only sixteen patients received more than 50 mg. daily. Moreover, this is a selected group of patients, including some with severe hypertension who were specially referred.

In addition to the cases described in detail above, three other patients treated with mecamylamine developed a tremor without mental symptoms: a woman, aged 31, with malignant hypertension and systemic lupus erythematosus and a woman, aged 51, with malignant hypertension and renal-vein thrombosis, both with moderate impairment of renal function (blood-urea level 40–70 mg. per 100 ml.); and a man, aged 51, with malignant essential hypertension and uræmia (blood-urea level 114 mg. per 100 ml.). The daily dosage of mecamylamine in these patients was 25, 50, and 30 mg. respectively. In the two women the tremor disappeared when the dosage of mecamylamine was reduced and pentolinium was partly or wholly substituted. It certainly seems that patients with severely impaired renal function are much more likely to develop symptoms of neurotoxicity while taking mecamylamine: of five patients in whom the blood-urea level was 100 mg. per 100 ml. or higher at the start of treatment four developed tremor and three of these mental symptoms. This complication is presumably related to the retention of mecamylamine in the body, its urinary excretion being reduced in renal failure (Milne et al. 1957).

Summary

Four cases are described in which a syndrome of tremor, mental confusion, and delirium developed under treatment with mecamylamine. Tremor developed in three other patients.

This complication of mecamylamine treatment occurred in patients receiving large dosages thereof (60–65 mg. daily); all these patients had or subsequently developed malignant hypertension and in all renal function was impaired.

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"How then does a good physician help a patient to face death and, accepting the ways of nature, to meet it? It is not done by all the busy paraphernalia of scientific medicine, keeping a vague shadow of life flickering when all hope is gone. . . . If man lives as a stranger in a lonely crowd, he dies utterly alone. Whereas his entry into the world is the first stage of the dissolution of an intimate partnership with his mother, his final departure is the ultimate in solitary procedures."—WILLIAM B. BEAN, *Arch. intern. Med.* 1958, **101**, 201.

ESSENTIAL FATTY ACIDS AND IDIOPATHIC HYPERCALCÆMIA OF INFANCY

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ATTENTION has been drawn to the possible role of a deficiency of "essential" fatty acids (linoleic and arachidonic acids) in the genesis of idiopathic hypercalcæmia of infancy (*Lancet* 1957). It has been suggested (Sinclair 1956a) that in the preparation of evaporated milks there is some loss of essential fatty acids and an even greater loss in the production of National Dried Milk made by passage over hot rollers; thus infants fed on dried milk preparations might receive a diet deficient in essential fatty acids. This suggestion could have provided an additional explanation of the frequency with which hypercalcæmia of infancy has been recognised in the United Kingdom, where dried milks are widely used, although one established factor to explain this frequency has been the extent of fortification of infant foods with vitamin D (*British Medical Journal* 1956).

We have studied the fatty-acid composition of samples of human milk, cows' milk before and after drying by a variety of commercial techniques, stored dried milk, and evaporated milk. Similar analytical studies of whole blood from three healthy infants have been made, as well as from three infants with idiopathic hypercalcæmia; the latter were studied both before and after treatment with cotton-seed oil (a rich source of linoleic acid). The fatty-acid analyses were made with the gas-liquid chromatogram (James and Martin 1956).

Methods

Each sample of milk was extracted exhaustively with ether-ethanol overnight to remove the lipids. Samples of whole blood were similarly extracted. The lipid extracts were saponified with methanolic potassium hydroxide, and the non-saponifiable material was extracted with petroleum ether. The alkaline solution was acidified with 5*N* sulphuric acid, and the fatty acids were extracted with petroleum ether. The extract was dried over anhydrous sodium sulphate, and the acids were converted to methyl esters by refluxing with anhydrous methanolic hydrochloric acid. Samples were stored in high dilution in petroleum-ether solution at +2°C, and the solvent was removed by evaporation before applying the sample to the gas-liquid chromatogram.

Under the conditions used for the fatty-acid analyses the gas chromatogram does not differentiate between the cis-cis, cis-trans, and trans-trans forms of linoleic acid. In addition linoleic and linolenic acids (the C_{18} di- and tri-unsaturated acids) are not separated; so the figures reported refer to the sum of these two acids. However, the linolenic-acid content of all the fats studied is likely to be low.

Studies in collaboration with other laboratories have shown excellent agreement between the gas chromatographic and spectrophotometric techniques for determining (1) a combined value for linoleic and linolenic acids and (2) arachidonic acid. The linoleic acid isolated from cows' milk by the gas chromatogram has been shown to be 9 : 12-octadecadienoic acid by the micro degradation procedure described by James and Webb (1957).

Results

Changes in Fat-composition of Milk on Processing to Dried Milk and on Storage

In Table I are listed the linoleic-acid + linolenic-acid contents of fresh milk, the same milk after concentration, and then after roller drying of this concentrated milk. No loss of these two acids was found, although the same experiment was repeated several times.

Table I also shows the linoleic-acid + linolenic-acid contents of the same sample of milk after storage under various conditions. After three months at room temperature or at 37°C the "essential" fatty-acid content had fallen to two-thirds of the original value; after six months' storage under similar conditions the "essential" fatty acids had dropped to less than half their previous value.

Comparative Analyses of Various Milk Preparations used in Infant Feeding

Table II shows comparisons of the fatty-acid composition (major components only) of two samples of human milk, fresh cows' milk, roller-dried milk, National Dried Milk, and 'Carnation' evaporated cows'-milk. The difference in the levels of linoleic + linolenic acids in human milk and cows' milk was less than has sometimes been supposed; but the effect of diet on these levels has yet to be determined.

TABLE I—LINOLEIC-ACID CONTENT OF COWS' MILK DURING PROCESSING AND STORAGE (AS PERCENTAGE OF ACIDS IN THE RANGE C_8–C_{20})

—	Fresh milk 12% total solids	Milk concentrated before drying (21% total solids)	After roller drying	Powder stored 3 mos. at room temperature	Powder stored 6 mos. at room temperature	Powder stored 3 mos. at 37°	Powder stored 6 mos. at 37°
Linoleic acid + linolenic acid	3·2	3·0	3·4	2·3	1·4	2·4	1·1

"*Essential Fatty-acid*" *Levels in Blood of Infants with Hypercalcæmia*

Case 1.—A male infant, born on Feb. 21, 1956, who had well-established hypercalcæmia, was studied at the age of 9 months. He was fed cotton-seed oil containing 50% w/w of linoleic acid for twenty days. During the first five days he received about 5 ml. of cotton-seed oil a day; during the next twelve days about 8 ml. a day; and during the last three days about 20 ml. a day. The serum-calcium (table III and fig. 1) had been high for so long that it seemed improbable that the fall from 15·8 mg. per 100 ml. to 9·9 mg. per 100 ml. in ten days was due to a chance variation in its level, although such variations are known to occur. Analyses were made of the fatty acids of whole blood taken from this child before, while, and after he was given cotton-seed oil. No significant change

TABLE II—MAJOR COMPONENTS OF MILK FATS FROM VARIOUS SOURCES EXPRESSED AS PERCENTAGE OF FATTY ACIDS IN RANGE C_8–C_{20}

Acid	Human milk		Cows' milk			
	Sample 1, ten days after start of lactation	Sample 2, three mos. after start of lactation	Fresh	'Ostermilk' roller-dried	National Dried Milk bought from a clinic	'Carnation' tinned milk
Myristic	5·7	9·0	..	10·7	10·6	9·4
Branched C_{15}	0·5	0·2	0·8	1·3	1·6	1·8
nC_{15}	0·8	0·4	1·0	1·3	1·2	1·4
Palmitoleic	3·9	2·6	2·2	2·2	2·0	2·4
Palmitic	26·5	20·0	26·4	29·7	16·6	21·8
Branched unsat. C_{17}	1·5	0·8	1·5	1·5	2·0	1·5
nC_{17}	0·7	Trace	0·7	1·1	0·6	0·8
Linoleic	5·1	4·4	3·2	3·5	4·1	4·4
Oleic	38·6	46·0	23·3	26·1	30·4	26·0
Isomers of oleic acid	Not measured		3·6	3·1	10·0	5·1
Stearic	12·1	7·7	10·3	12·0	10·5	13·8
Poly-unsat. C_{20} (not arachidonic)	1·8	Not measured	..	..	1·0	2·0

TABLE III—COMPARISON OF CHEMICAL FINDINGS IN BLOOD OF NORMAL INFANTS AND THOSE WITH HYPERCALCÆMIA

—	Date	Treatment	Serum-calcium (mg. per 100 ml.)	Serum-cholesterol (mg. per 100 ml.)	Linoleic and linolenic acids as percentage of total fatty acids	Arachidonic acid as percentage of total fatty acids
3 *infants without hypercalcæmia*	—	—	10·7	—	9·4	5·4
	—	—	10·6	—	10·3	4·8
	—	—	11·7	—	10·6	4·3
3 *infants with hypercalcæmia:*						
Case 1	Nov. 29, 1956		14·8	—	—	—
	Dec. 6, „		14·5	—	—	—
	„ 17, „		15·8	—	8·6	3·4
	„ 20, „	Cotton-seed oil started				
	„ 27, „		9·9	—	—	—
	Jan. 7, 1957		10·3	—	9·8	5·6
	„ 10, „	Cotton-seed oil stopped				
	„ 20, „		11·5	—	7·1	3·6
	„ 29, „		12·7	—	—	—
	Feb. 5, „		11·6	—	—	—
	„ 12, „		12·2	—	9·9	4·2
Case 2	June 4, 1957		13·8	310	8·6	4·6
	„ 11, „	Cotton-seed oil started	14·1	—	—	—
	„ 18, „		12·5	257	25·8	5·1
	„ 25, „	Cotton-seed oil stopped	13·7	296	25·6	4·3
	July 1, „		14·6	287	—	—
	„ 9, „	Cortisone 100 mg. b.d. started				
	„ 16, „		12·3	—	8·6	4·6
Case 3	Aug. 23, 1957		15·4	—	—	—
	„ 27, „		13·2	251	9·9	4·6
	„ 29, „	Cotton-seed oil started				
	Sept. 4, „		11·2	218	22·6	4·5
	„ 11, „		12·2	209	28·2	5·4
	„ 13, „	Cotton-seed oil stopped				
	„ 17, „		12·1	223	—	—

occurred in the blood levels of linoleic and linolenic acids or of arachidonic acid.

As a result of the observed changes in serum-calcium levels more detailed studies were made on two children with the complex type of hypercalcæmia.

Case 2.—A boy, born on April 2, 1956, was studied at the age of 14 months. He had the facies seen in severe hypercalcæmia, severe osteosclerosis, a raised blood-urea, and hypercholesterolæmia. Between the ages of 12½ months and 14 months he had received a moderately low-calcium diet containing no vitamin D. He gained no weight in that period, and his serum-calcium and blood urea remained high (table III and fig. 2). Throughout the tests reported here he was fed on homogenised cows'-milk. A four-day balance study before he was given any cotton-seed oil showed an average daily positive balance of 172 mg. of calcium. A week after treatment with cotton-seed oil was started (about 40 ml. a day in divided doses before each feed), a second four-day balance study showed an average daily negative balance of 23 mg. of calcium. This difference between the two balances was explained by an increase in the fæcal calcium. There was no change in the urinary calcium. The serum-calcium showed a transient fall after seven days simultaneously with a slight transient fall in the levels of plasma-phospholipids and total, free, and esterified cholesterol. Within fourteen days these levels had all risen, and after twenty-one days' treatment with cotton-seed oil the serum-calcium was as high as it had been before the oil was given. The linoleic-acid level in the whole blood rose within seven days of the start of treatment with cotton-seed oil and was still high at fourteen days.

Case 3.—A girl, born on Jan. 13, 1957, was studied at the age of 7 months. She had a history of vomiting and constipation for some weeks. She had early osteosclerosis. Her serum-calcium was 15·4 mg. per 100 ml. and blood-urea 52 mg. per 100 ml. Four days later her serum-calcium level was 13·2 mg. per 100 ml. and serum-cholesterol 251 mg. per 100 ml. (table III and fig. 2). After a week's treatment with cotton-seed oil 40 ml. daily in divided doses before feeds, her serum-calcium was 11·2 mg. per 100 ml., but after two weeks' treatment it had risen to 12·2 mg. per 100 ml. A slight initial gain in weight during treatment was not sustained. The level of linoleic + linolenic acid was high both one and two weeks after the start of treatment with cotton-seed oil.

Discussion

The results here do not support the proposition that the actual processing of cows' milk, whether by vacuum evaporation or by roller drying, causes any great fall in the level of linoleic + linolenic acids. Linolenic acid can exist in three forms—cis-cis, cis-trans, and trans-trans—but only the cis-cis form can be utilised. Van Beers et al. (1957) have shown that about 50% of the linoleic acids of cows' milk is in the cis-cis form; so it cannot be claimed that infants fed on cows' milk are being provided solely with the wrong stereoisomer. Furthermore there is no chemical reason to expect rearrangement of the cis-cis linoleic acid during drying.

The level of linoleic + linolenic acids did, however, fall on prolonged storage of dried milks, as previously stated by Sinclair (1956b), but we have no evidence at present to suggest that the levels observed lead to any deficiency.

The blood levels of linoleic + linolenic acids and arachi-

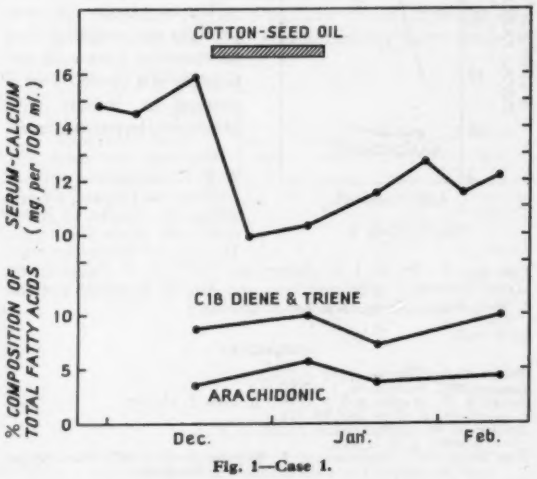

Fig. 1—Case 1.

donic acid were similar in three normal infants to those found in three infants with hypercalcæmia.

The fact that the amounts of arachidonic acid fall within the normal range precludes any suggestion that the combined level of linoleic and linolenic acids conceals a lowered linoleic level and an enhanced linolenic level, since it is known that cis-cis linoleic acid is the precursor of arachidonic acid.

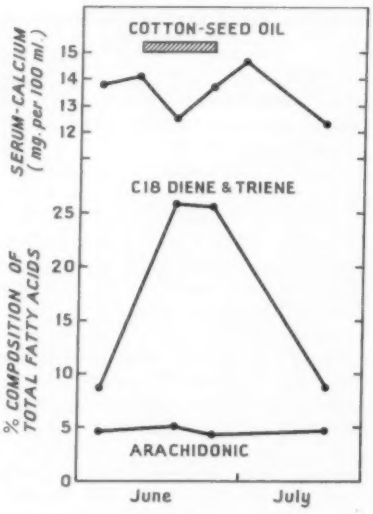

Fig. 2—Case 2.

A transient fall in the serum-calcium occurred in all three infants when given cotton-seed oil by mouth; this was probably due to an increased excretion of calcium in the fæces, shown by balance studies in case 2. Although the linoleic+linolenic-acid levels in the blood rose in two cases, the serum-calcium rose again while the fatty-acid levels were still high (table III and figs. 2 and 3).

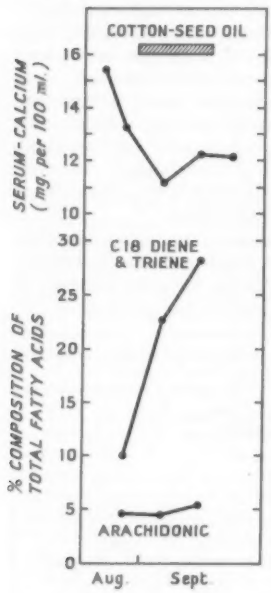

Fig. 3—Case 3.

It is impossible, on the available evidence, to say whether or not there is any association between the changes in the serum-cholesterol and serum-calcium levels.

These results do not provide any evidence that an essential fatty-acid deficiency is a cause of, or is present in, infants with idiopathic hypercalcæmia.

We wish to thank Dr. W. F. J. Cuthbertson, of Glaxo Laboratories Limited, for providing the samples of roller-dried and freeze-dried milk; Dr. Andrew Barlow for referring case 2; Dr. K. J. Kingsbury and Dr. V. H. T. James for the serum-cholesterol determinations; and Mr. H. Hadaway and Mr. I. W. J. Evans for much technical assistance.

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SEPTICÆMIA IN MODERN THERAPY

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8 CASES of septicæmia in surgical patients, all within ten months, are reported here to illustrate the increasing incidence of serious infections associated on the one hand with the emergence of the resistant hospital staphylococcus, and on the other with corticosteroid therapy.

Case-reports

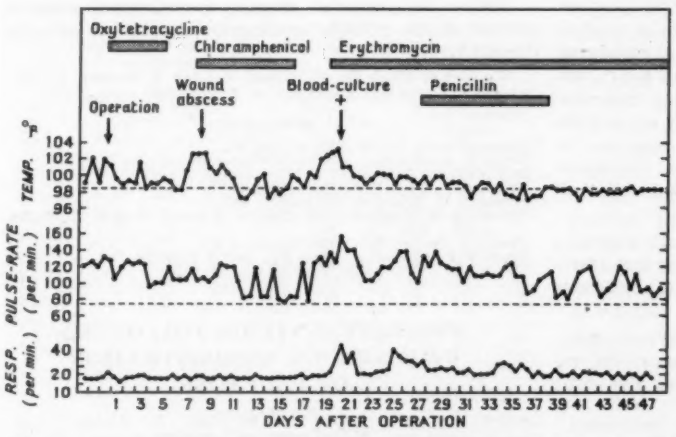
Case 1.—A man, aged 44, was admitted with severe ulcerative colitis. Failure of cortisone (150 mg. per day for six weeks) necessitated colectomy and ileostomy as an emergency measure under corticosteroid cover to prevent collapse (Slaney and Brooke 1957). Eight days later he developed a wound abscess, containing *Staphylococcus pyogenes* sensitive only to chloramphenicol and erythromycin; chloramphenicol was administered. After a further ten days when the patient was again gravely ill (see figure), blood-culture demonstrated a heavy growth of *Staph. pyogenes*, with similar resistance. The same organism was also isolated from sputum, urine, the site of an abdominal drainage tube, the distal sigmoid colostomy, and a subcutaneous abscess on the arm. X rays revealed metastatic abscesses in the lungs, which gradually disappeared as the patient's condition responded to erythromycin (2 g. daily) over the next six weeks. Penicillin 20 million units daily, despite insensitivity to this drug, was added to erythromycin for its possible synergic effect. The patient recovered.

Case 2.—A man, aged 40, with ulcerative colitis, underwent primary colectomy under cortisone cover following steroid therapy. Eight days later the patient's pulse-rate rose to 130 and the temperature to 103°F, though he felt well. Blood-culture revealed septicæmia due to *Clostridium welchii* and *Diplococcus mucosus*. Both organisms were sensitive to chloramphenicol, which was given for five days, followed by erythromycin for twelve days. He recovered.

Case 3.—Colectomy and rectal anastomosis were performed in a man, aged 33, on account of extensive Crohn's disease of the colon, corticosteroid cover being given since he had previously received steroid therapy. A week later peritonitis developed; laparotomy revealed disruption of the suture line necessitating closure of the rectal stump and the establishment of an ileostomy. Eight days after this second operation the temperature rose to 103°F and the pulse-rate to 140; an erythematous rash appeared on the face and neck and became purpuric the following day. *Staph. pyogenes* resistant to all antibiotics except chloramphenicol and erythromycin was grown in considerable quantities from the blood-culture. An identical organism was isolated from the patient's throat, the ileostomy, a bedsore, and a subsequent metastatic abscess over the sternum. Erythromycin 1·5 g. daily was given for three weeks and chloramphenicol 1 g. daily for ten days; the blood-culture was sterile at the end of the first week.

Case 4.—A woman, aged 40, so ill with ulcerative colitis that operation was impossible on admission, had been receiving cortisone for nine months. An abscess due to disintegration of the sigmoid colon was present in the left iliac fossa. Attempts to prepare her for colectomy proved fruitless. She became dyspnœic with signs of pericarditis, at which time *Staph. albus* was grown from blood-culture. She died two days later from a pulmonary embolus.

Case 5.—A woman, aged 40, collapsed eighteen hours after primary colectomy undertaken on account of severe ulcerative colitis previously treated with hydrocortisone enemas. In the absence of an obvious cause for the collapse, and since the



Data on case 1. Cortisone was withdrawn on the eighth postoperative day and corticotrophin on the twelfth postoperative day.

patient appeared to be dying, intravenous hydrocortisone was given with an immediate satisfactory response. Chloramphenicol was added as protection against possible infection during steroid therapy; nevertheless the patient had a rigor and her temperature rose to 101·5°F three days later. *Escherichia coli* was grown from the blood; though therapy with chloramphenicol was intensified, subsequently an enterococcus was grown in addition to the coliform organisms, so neomycin had to be given in addition. After many vicissitudes due to bleeding and coagulation defects the patient died on the eighth postoperative day in hepatic coma. The organisms were isolated from hepatic blood samples taken immediately after death.

Case 6.—The situation with a man, aged 24, differed from that in the foregoing cases since staphylococcal septicæmia developed two months after cessation of cortisone therapy (100 mg. daily for two months) for ulcerative colitis and two to three weeks after operation for this condition without steroid cover. *Staph. pyogenes*, resistant only to penicillin, was grown from blood-culture; the condition was controlled by tetracycline.

The association of corticosteroids and septicæmia may only have been coincidental in this case.

2 cases of septicæmia, 1 fatal, have also been seen in patients who had never received cortisone.

Case 7.—A paraplegic man, aged 42, had a plastic repair of a decubitus ulcer over the right ischium. He was discharged from hospital with the wound healed except for a linear area at one edge of the skin-flap. A week later he was readmitted in a confused and toxic state and, though afebrile, the gluteal area was inflamed with pus discharging from the linear area mentioned previously; penicillin and streptomycin were given. Four days later the patient's general condition was poor with temperature of 103°F and pulse-rate 130; a blood-culture was taken and the whole flap laid open. Proteus sensitive to streptomycin and chloramphenicol but insensitive to tetracycline, and *Staph. pyogenes* insensitive to all antibiotics except chloramphenicol and erythromycin, were found to be growing from the swab taken on admission. Combined therapy with chloramphenicol (1 g. daily) and erythromycin (1·6 g. daily) was therefore begun; twenty-four hours later the resistant staphylococcus was isolated from blood-culture. These drugs were continued for a further two weeks, at the end of which all blood-cultures were sterile.

Case 8.—A man, aged 49, was treated by circumcision for severe phimosis and extensive balanitis which had caused meatal stenosis. He was provided with a meatal dilator and instructed in its use. Three months later the patient was readmitted with a five-day history of dysuria, extreme frequency, and rigors; penicillin 1 mega unit b.d. had been administered by his private practitioner without effect. On admission he was toxic (temperature 105°F, pulse-rate 130). Acute cystitis and prostatitis complicated by ascending pyelonephritis was diagnosed; streptomycin 1 g. b.d. was given. The following morning his clinical condition was better; his temperature had fallen to 100°F and pulse to 110. That evening, however, his temperature rose to 104°F and pulse-rate to 140, and an erysipeloid rash appeared on the left forearm and later elsewhere. Urine culture revealed proteus and *Staph. pyogenes* resistant to all antibiotics except chloramphenicol and erythromycin, so treatment with chloramphenicol was started immediately (1·25 g. daily). The following day the patient was disorientated with a temperature of 104°F; in addition to the chloramphenicol, erythromycin was given by continuous drip (2·4 g. per day). The blood-culture yielded a growth of *Staph. pyogenes* insensitive to all antibiotics except chloramphenicol and erythromycin. Nevertheless the patient's condition became worse and he died seventy hours after admission. At necropsy acute suppurative prostatitis with thrombosis in the periprostatic plexus was found; basal hæmorrhagic cystitis was also present, but there was no evidence of pyelonephritis.

Discussion

These cases are reported to draw attention to the new era of infection that has arisen causing septicæmia to

CAUSAL ORGANISM IN EIGHT CASES OF SEPTICÆMIA

Case no.	Age (yr.)	Sex	Diagnosis	Corticoids administered	Organism	Sensitivities						Result
						Penicillin	Strepto-mycin	Chlor-amphenicol	Tetra-cycline	Erythro-mycin	Neo-mycin	
1	44	M	Ulcerative colitis	Yes	*Staph. pyogenes*	−	−	+	−	+		Recovered
2	40	M	Ulcerative colitis	Yes	*Cl. welchii*	+	−	+	+	N.K.		Recovered
					Diplococcus mucosus	−	−	+	+	+		
3	33	M	Crohn's colitis	Yes	*Staph. pyogenes*	−	−	+	−	+		Recovered
4	40	F	Ulcerative colitis	Yes	*Staph. albus*	−	−	−	−	−		Died
5	40	F	Ulcerative colitis	Yes	Coliform	N.K.	±	+	+	N.K.	+	Died
					Enterococcus	N.K.	−	+	−	N.K.		
6	24	M	Ulcerative colitis	Yes; but therapy ceased before positive blood-culture	*Staph. pyogenes*	−	+	+	+	+		Recovered
7	42	M	Decubitus ulcer	No	*Staph. pyogenes*	−	−	+	−	+		Recovered
8	49	M	Suppurative prostatitis	No	*Staph. pyogenes*	−	−	+	−	+		Died

+ = sensitive. − = insensitive. N.K. = not known.

become commonplace, and to the two principal factors conspiring to produce it. The emergence of the virulent resistant staphylococcus has been well documented (Shooter et al. 1957, McDonald and Timbury 1957). Its dangers are clearly demonstrated by case 8, a man who entered hospital for a trivial operation, only to acquire the hospital staphylococcus, which, though sensitive to chloramphenicol and erythromycin in vitro, responded in no way to these drugs in vivo so that he died of fulminating septicæmia.

Less well recognised is the effect of corticosteroids; indeed this has even been discounted (Popert and Davis 1958). But there is ample clinical and experimental evidence to incriminate these drugs.

Shaper and Dyson (1955) reported 2 deaths due to staphylococcal septicæmia in patients receiving cortisone, one for rheumatoid arthritis and the other for exfoliative dermatitis; and Dubois-Ferrière (1951) reported another such case. Hayes and Kushlan (1956) recorded 2 cases of "bacteræmia" due to resistant strains of staphylococci in 12 patients receiving steroids for ulcerative colitis; 1 patient died, the other developed multiple metastatic abscesses but eventually recovered. Smith and Cleve (1957) record a further death from staphylococcal septicæmia in a patient receiving cortisone.

Thomas (1955) showed that an injection of streptococci intradermally into rabbits causes a brisk local reaction followed by prompt healing. If cortisone is given before the injection of streptococci there is no local response and the rabbits appear healthy for a few days then die suddenly; at necropsy colonies of streptococci are found in all tissues, there being practically no inflammatory response; the animal thus appears to become a living culture-medium in the interval between injection and death.

This state of affairs was closely paralleled in several of our patients—notably case 2, who felt perfectly well despite the profuse growth of *Cl. welchii* in his peripheral blood. The danger period is usually at the end of the first postoperative week. As might be expected from the behaviour of infections in Cushing's syndrome many of the overt signs of septicæmia are often absent, and a blood-culture should be performed in any patient receiving corticosteroids who has pyrexia or tachycardia without obvious cause; chloramphenicol cover should be considered for any patient undergoing surgery for an infective condition while under steroid therapy, leaving erythromycin in reserve for further developments.

Septicæmia associated with corticosteroids is modified in its clinical manifestations; it appears also to differ from unattenuated septicæmia in its better response to therapy. Of 6 patients in the cortisone group 2 died; but these deaths were as much from other causes (liver failure, &c.) as from septicæmia and probably would have occurred even without infection. Provided the condition is recognised, even resistant staphylococcal infections during corticosteroid therapy may be brought under control: this has proved more difficult in the group not receiving corticosteroid therapy.

Summary

8 cases of septicæmia have been seen in a ten-month period.

In 5 and possibly 6 patients corticosteroid therapy appeared to have played a part in precipitating septicæmia with modified clinical manifestations.

In 6 patients the organism was *Staph. pyogenes*, which was resistant to penicillin in most cases and to all antibiotics in 1 case.

Before corticosteroid therapy is instituted possible complications, notably septicæmia, should be carefully considered.

We wish to thank Dr. E. Bulmer and Mr. V. Brookes for permission to report case 6, and Mr. O. T. Mansfield for case 7.

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HYPERPYRUVATURIA FOLLOWING INTRAVENOUS ADMINISTRATION OF FRUCTOSE

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THE wish to provide, in certain diseases, the sugar which the patient can most easily assimilate has stimulated much work on the metabolic differences between glucose and fructose. This work indicates that fructose is more assimilable than glucose and is better metabolised in diabetic patients and in experimental diabetes (Pletscher 1953, Smith 1953, Renold and Thorn 1955, Leuthardt 1956, Hoenig 1957).

Most papers on this subject refer to the liver, which metabolises 30–50% of intravenously infused fructose (Mendeloff and Weichselbaum 1953). We deal here with some aspects of kidney function under the influence of glucose and fructose. Our results show that, on intravenous administration fructose increases the urinary excretion of pyruvate, mainly through changes of renal tubular activity. Glucose does not do this.

Investigation and Results

The patients studied were selected from the wards of the hospital. All had a carbohydrate intake exceeding 200 g. daily and fasted for more than twelve hours before the test.

25 g. of glucose or fructose, as a 40% solution, was injected over a period of three to five minutes. Samples of venous blood for plasma-pyruvate estimation were withdrawn homolaterally through an indwelling needle before the injection of the sugar (two samples) and then, after the injection, at fifteen-minute intervals for sixty minutes. Before the injection one urine specimen was collected for at least one hour. After the sugar was given a second urine specimen was again collected for at least one hour. At the beginning of the experiment 500 ml. of clear tea without sugar was administered.

The urinary and plasma pyruvate content were determined by the method of Friedemann and Haugen (1943) as adapted by Slavík and Michalec * (1949). The quantity of urinary pyruvate was calculated from the product of the urine volume and the urinary concentration of pyruvate. The quantity of pyruvate filtered was estimated as the product of the average glomerular filtration-rate (estimated as the endogenous-creatinine clearance) x the average plasma-pyruvate level. Plasma and urine creatinine were estimated by the method of Bonsnes and Taussky (1945); it was not influenced by the pyruvate actually present. From the quantity filtered and excreted, the percentage of pyruvate reabsorbed was calculated.

Two series of investigations were performed. In the first, urinary pyruvate excretion was studied in control patients with miscellaneous non-metabolic disorders (25

* Sodium pyruvate for the calibration curve was kindly supplied by F. Hoffmann, LaRoche & Co., Basle.

TABLE I—EFFECT OF FRUCTOSE (40% SOLUTION INJECTED INTRAVENOUSLY) ON THE RENAL EXCRETION, FILTRATION, AND REABSORPTION OF PYRUVATE. A–FASTING VALUES, B–VALUES FOLLOWING THE INJECTION, C–DIFFERENCE

Subject no.	Pyruvate excreted (μg/min./1·73 m²)			Pyruvate filtered (μg/min./1·73 m²)			Pyruvate reabsorbed (% of pyruvate filtered)		
	A	B	C	A	B	C	A	B	C
1	23	92	69	2000	1780	−220	99	95	−4
2	24	183	159	2360	2180	−180	99	92	−7
3	20	92	72	2420	2500	80	99·5	96·5	−3
4	12	106	94	1710	1820	110	99	94	−5
5	16	209	193	1850	2350	500	99	91	−8
6	34	169	135	1170	1720	550	97	90	−7
7	15	184	169	1380	2130	750	99	91·5	−7·5
8	13	196	183	1340	2040	700	99	90	−9
9	10	106	96	1010	1740	730	99	94	−5
10	14	122	108	1220	2180	960	99	94·5	−4·5
Average	18·1	145·9	127·8	1646	2044	398	98·9	92·9	−6
P			<0·001			0·01–0·02			<0·001

investigations in 7 patients with both glucose and fructose loading on alternate days, 10 patients with fructose, and 1 patient with glucose alone) and in cirrhotic patients (23 investigations in 8 patients with glucose and fructose, 5 patients with fructose, and 2 patients with glucose alone). In the second, renal studies were performed in addition in 10 arbitrarily selected subjects.

Injection of fructose produced, both in the control and cirrhotic groups, a pronounced increase in urinary pyruvate (table, figs. 1–3). The average values (expressed in μg per min. per 1·73 sq. metre of body-surface) were 117·9 μg (range 45·4 to 206·6) in the first, and 116·5 μg (35·3 to 222·9) in the second group ($P<0·001$). The increase following glucose was insignificant: 3·3 μg. (−4·2 to 12·6) and 2·9 μg. (− 6·4 to 27·5) ($0·10<P<0·20$; $0.30<P<0·40$).

The average increase in pyruvate filtered following fructose was 398 μg. per minute per 1·73 sq. m. (−220 to 960). The average decrease in pyruvate reabsorbed was 6% (range 3–9%) of the quantity filtered.

Discussion

In a previous paper (Hoenig 1957) we showed that intravenous administration of fructose brings about a greater increase in urinary inorganic phosphorus than administration of glucose. Our present results show that the same is even more true of the excretion of pyruvate. We have found only two reports on this subject: in one (Sasaki 1950) a *decreased* pyruvaturia was found, and in the other the *concentration* of urinary pyruvate increased after administration of fructose (Enoki and Mukaiama 1952).

The increased excretion of pyruvate diminished rapidly. In 3 of 7 patients only moderate hyperpyruvaturia was present during the second hour after the injection of fructose.

From the therapeutic standpoint we were interested in whether this hyperpyruvaturia depended on the duration of the infusion period. 500 ml. of 10% fructose solution was infused during 80–110 minutes in 3 subjects. The hyperpyruvaturia was less evident than after rapid administration. The increase in urinary pyruvate during the infusion was 85·2, 69·4, and 95·7 μg. per minute per 1·73 sq. metres.

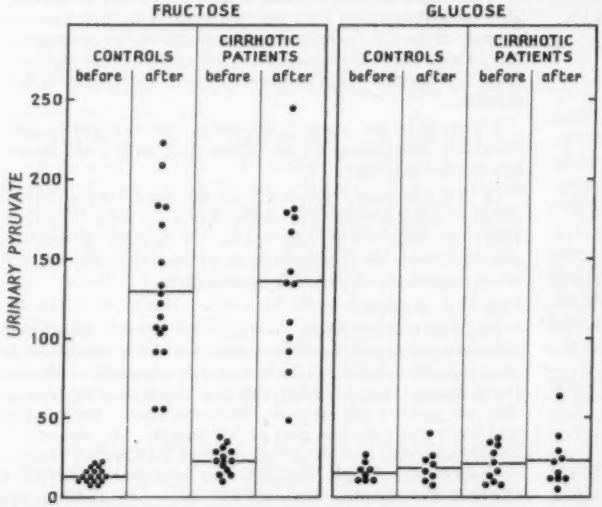

Fig. 1—Values of urinary pyruvate (μg. per minute per 1·73 sq. metre) before and after intravenous administration of fructose and glucose. The rise after fructose is striking. There is only an insignificant rise following glucose. The control and the cirrhotic groups do not differ.

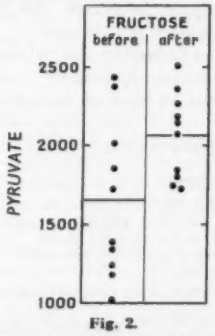

Fig. 2.

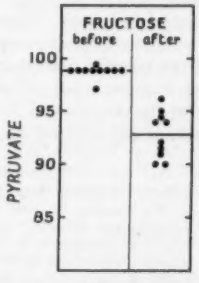

Fig. 3.

Fig. 2—Values of filtered pyruvate (μg. per min. per 1·73 sq. m.) before and after intravenous administration of fructose.

Fig. 3—Values of pyruvate reabsorbed before and after intravenous administration of fructose (% of the filtration values). The drop in the reabsorption-rate is the main cause of the hyperpyruvaturia.

To explain the observed hyperpyruvaturia, it would be necessary to know the mechanism of renal excretion of pyruvate. We have so far not found any reports on this. Since other related acids (e.g., lactic acid) are eliminated by filtration and reabsorption (Miller and Miller 1949), we can assume that the same mechanism is involved in the renal excretion of pyruvate.

The hyperpyruvaturia following fructose administration is therefore attributable either to the increase in the quantity of pyruvate filtered or to depression of its tubular reabsorption.

Our results suggest that the observed phenomenon reflects a depressed renal tubular reabsorption of pyruvate rather than alterations in the filtration mechanism: the average increase in pyruvate filtered could not by itself produce the hyperpyruvaturia observed, and there was hyperpyruvaturia in cases where the pyruvate filtered decreased (cases 1 and 2, table I).

The mechanism of this depression is obscure. There may be either a competition between fructose and pyruvate for a substance implicated in their tubular reabsorptive mechanism, or the reabsorption of pyruvate may be inhibited by an intracellular metabolic product. The observation that fructose and pyruvate inhibit each other's

uptake by the perfused liver (Laguna et al. 1956) may be of some interest in this connection.

Cirrhotic patients behaved similarly to control subjects. In some patients we found a higher fasting value of urinary pyruvate. This has been reported elsewhere in severe liver failure (Amatuzio and Nesbitt 1950, Thompson 1956). According to our results, it is due to a depression of the tubular reabsorption of pyruvate.

In conclusion, we can say that intravenous administration of fructose interferes with the metabolism of the renal tubules. This leads to an increase in the excretion of pyruvate, inorganic phosphate (Hoenig et al. 1958), and perhaps of other metabolites. Further studies are required, to assess the clinical importance of these observations.

Summary

Infused intravenously, fructose increases the renal excretion of pyruvate. Glucose does not do this.

The increased renal excretion is mainly due to depression of the tubular reabosorption of pyruvate.

In most cases it ceases within an hour of the administration of the sugar.

Its extent depends on the infusion-rate.

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SUCCESSFUL PREGNANCY UNDER TREATMENT FOR MALIGNANT HYPERTENSION

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So far as we are aware, no report has yet appeared of a successful pregnancy in a patient in whom malignant hypertension has been controlled with hypotensive drugs. We report a patient with a fourteen-year history of severe hypertension who gave birth to a surviving premature infant after two previous episodes of malignant hypertension, one four years and the other fourteen years ago.

Case-report

In February, 1942, at the antenatal clinic at University College Hospital, a woman aged 22 was found to be hypertensive in the twentieth week of her first pregnancy, her blood-pressure being 220/140 mm. Hg. Malignant hypertension was diagnosed because of bilateral papillœdema and retinitis. Abdominal hysterotomy was done at twenty-six weeks. In September, 1942, she was admitted to the London Hospital for investigation of the hypertension. Immediately before admission she had had frequency of micturition, dysuria, and lumbar pain. Her blood-pressure varied between 190/130 and 215/140 mm. Hg, but she showed no other abnormality, and the papillœdema and retinitis noted in February had completely regressed. Renal function was normal, apart from persistent albuminuria. A culture of urine yielded a scanty growth of *Staphylococcus albus* and a moderate growth of coliform bacilli.

In 1945 the patient consulted the gynæcological department at the Westminster Hospital, being anxious to undertake a further pregnancy. Her blood-pressure was 210/140 mm. Hg, her blood-urea level 40 mg. per 100 ml., and an intravenous pyelogram normal, but her urine contained protein 100 mg. per 100 ml. In September, 1946, when she miscarried a macerated fœtus at 26 weeks, her blood-pressure was 230/180 mm. Hg.

In 1951, at the age of 31, she attended the gynæcological department at Hammersmith Hospital. Her blood-pressure was 210/140 mm. Hg, and her optic fundi showed arterial narrowing but no retinitis. Her urine was now, for the first time, free from albumin; her blood-urea level was 21 mg. per 100 ml., and the specific gravity of her urine ranged from 1·002 to 1·020.

She next presented at the ophthalmic clinic of the Hospital in December, 1952, complaining of blurring of vision for a month. Bilateral papillœdema with hæmorrhages and exudates was noted, and she was admitted to a medical ward. An additional relevant fact in her history was the absence of any hypertensive disease in her family. In addition to the visual difficulties she had had breathlessness on exertion and ankle swelling for two weeks and two attacks of paroxysmal nocturnal dyspnœa. She was dyspnœic, her pulse-rate was 120 and blood-pressure 230/160 mm. Hg. A presystolic triple rhythm was noted, and she was in congestive heart-failure; soon after admission she had an attack of acute pulmonary œdema. Radiography of her chest showed considerable left ventricular hypertrophy, which was confirmed by electrocardiography. An unusual feature was a prolongation of the P–R interval (0·24 sec.), which has been present intermittently on subsequent records. A transient albuminuria was present while the patient was in heart-failure. Her blood-urea level was 21 mg. per 100 ml., and isosthenuria was present. She improved rapidly on treatment with subcutaneous hexamethonium bromide together with digoxin, diuretics, and a low-salt diet. She was stabilised on subcutaneous hexamethonium bromide 60 mg. thrice daily, which reduced the blood-pressure to 110/70 mm. Hg in the erect position an hour after the injection. On this treatment papillœdema resolved completely in two months.

A year later the patient's treatment was changed to subcutaneous pentolinium 60 mg. thrice daily with a satisfactory hypotensive response.

In 1955 reserpine (' Serpasil ') 0·1 mg. three times a day was added to the treatment, and during follow-up from December, 1952, to June, 1956, the patient remained subjectively extremely well. Radiological and electrocardiographic evidence of left ventricular hypertrophy persisted.

Successful Pregnancy

In June, 1956, at the age of 37, the patient was found to be six-weeks pregnant. As she was most anxious to continue with the pregnancy, and as her blood-pressure was easily controlled, it was decided that she should continue under close supervision. She was given a high-protein low-carbohydrate low-salt diet, and strict attention was paid to her weight. She was seen at weekly intervals, and much variation was noted in her response to hypotensive drugs, together with a definite decrease in dosage requirements. The total daily pentolinium dosage was decreased from 180 to 120 mg.; but even with this reduction readings of 95/60 mm. Hg were noted an hour after the injection. In view of possible impairment of the placental

circulation she was admitted at the fifteenth week of pregnancy. She was transferred to oral mecamylamine 10 mg. b.d., together with the previous dosage of reserpine. She continued her weekly attendances at the antenatal clinic. Her weight, which at the beginning of pregnancy was 151 lb., remained almost stationary. She was last seen at this clinic when twenty-nine weeks pregnant. Her blood-pressure in the erect position was 170/120 mm. Hg, and in the recumbent 200/140 mm. Hg. She had no œdema, and her weight showed a sudden drop of 2 lb. 4 oz. from that of the previous week. She felt perfectly well but was admitted for observation.

Two days later she had a sudden onset of colicky lower abdominal pain and a vaginal hæmorrhage of about 300 ml. The fœtal heart was still heard. She went spontaneously into labour eight hours later and gave birth spontaneously to a healthy male infant weighing 4 lb. 1 oz. The placenta followed rapidly with about 200 ml. of blood-clot; it weighed 1 lb. 2 oz. and had obviously been involved in an accidental hæmorrhage. The patient's blood-pressure after delivery was 170/125 mm. Hg in the supine position. Over the next month a gradual increase in mecamylamine dosage to the present daily total of 45 mg. was necessary. The baby was discharged when at the age of 36 days, weighing 5 lb. 10 oz. and has remained fit and well.

Discussion

The pregnancy produced a live baby in spite of two previous episodes of malignant hypertension. The first of these occurred during pregnancy in 1942 and reverted to benign hypertension, judged by retinal changes, after termination of the pregnancy. Malignant hypertension was again diagnosed in 1952 and responded to hypotensive drugs, on which the patient has been maintained until now.

The original hypertensive episode in 1942 must be regarded as " chronic hypertension " and not as a pregnancy toxæmia, because of severe hypertension at the twentieth week of pregnancy. Albuminuria persisted for at least seven months after termination of the pregnancy. This albuminuria is of considerable interest because the urine at present is free from albumin, as it has been on numerous examinations in the past fifteen years. Albuminuria is almost universal in malignant hypertension (Ellis 1938, Kincaid-Smith et al. 1958), and its absence here probably indicates that the vascular changes of malignant nephrosclerosis had not yet developed when hypotensive therapy was instituted in 1952. The subsequent favourable course and normal renal function support this hypothesis.

The ætiology of the hypertension in the present case is by no means clear. The rarity of essential malignant hypertension in this age-group (Platt 1948, Kincaid-Smith et al. 1958) caused us to seek some renal or other cause. The dysuria and positive urine culture in 1942 introduced the possibility of chronic pyelonephritis as a causal factor. This condition is notoriously difficult to diagnose; but, in the absence of any further positive evidence, and with repeated normal intravenous pyelograms and urine deposits, we think it unlikely. Investigation has provided no other evidence of any underlying cause of the hypertension. Pregnancy was clearly the precipitating factor in 1942.

Irrespective of the cause of malignant hypertension this condition carries a very poor prognosis, most patients dying in three months. Survival beyond two years is exceptional in untreated cases (Kincaid-Smith et al. 1958). A slight fall in the blood-pressure after the abdominal hysterotomy in 1942 was associated with disappearance of the papillœdema and retinal exudates in seven months.

The second episode of malignant hypertension, in 1952, responded readily to hypotensive drugs. Few data are available for the prognosis of malignant hypertension in pregnancy, but death from uræmia may certainly occur within a short period in spite of termination of the pregnancy (Heptinstall 1953, Currens et al. 1956, Kincaid-Smith et al. 1958).

Termination of this pregnancy was at first contemplated in view of the past history and the well-known risks to the mother. Because of the patient's insistence, however, it was decided to continue the pregnancy under close supervision.

Young (1952) showed that hexamethonium bromide accumulates in the amniotic fluid of animals. Morris (1953) reported deaths from paralytic ileus in two of ten infants where hexamethonium bromide had been used as a hypotensive agent during pregnancy; he consequently advised that hexamethonium should be withheld at least twenty-four hours before delivery. Because of its diffusibility we expected mecamylamine to produce similar effects in the fœtus and had therefore intended to discontinue it a week before cæsarean section at thirty-four weeks. Spontaneous premature labour prevented these precautions, but in spite of full doses of mecamylamine until the time of delivery and the excretion by the infant of 0·53 mg. of mecamylamine, no paralytic ileus or other complications developed.

Although commonly the child in cases of hypertension is smaller than usual for the period of gestation, in this case, with an undoubted gestation period of twenty-nine weeks and two days, the infant was unusually large, suggesting that hypotensive treatment had influenced favourably the placental ischæmia known to be associated with maternal hypertension (Browne and Veall 1953).

The decreased pentolinium requirements between the eleventh and fourteenth weeks of the pregnancy interested us because of the known physiological fall in the blood-pressure which takes place in the second trimester (Browne and Browne 1955).

In view of the success reported here, there may be reason to give hypotensive drugs such as mecamylamine a more extensive trial in similar cases. An integral part of the management should be the maintenance of the erect posture as much as possible instead of the traditional rest in bed.

Summary

A successful pregnancy ensued in a patient in whom malignant hypertension was controlled with hypotensive drugs. Hypotensive drugs, particularly mecamylamine, should be given a more extensive trial in severe hypertension in pregnancy.

We are grateful to Prof. J. McMichael, under whose care this patient was treated from 1952 until 1956; Dr. J. P. M. Tizard, who supervised the management of the premature infant; Dr. Donald Hunter and the departments of obstetrics and gynæcology at the Westminster and University College Hospitals for details about the patient's previous hospital admissions; and Dr. M. D. Milne for estimating the mecamylamine excreted by the premature infant.

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"KWASHIORKOR" IN AN ADULT
DUE TO AN INTESTINAL BLIND LOOP

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WHENEVER uncontrollable diarrhœa follows an abdominal operation short-circuiting of the small bowel should be suspected, according to Alvarez (1957). The patient now reported had signs of severe malabsorption after a side-to-side anastomosis had been made in the lower ileum. His hair turned red while the malabsorption was at its worst, and reverted to its normal brown colour once he was cured by restoration of intestinal continuity.

Case-report

A white man, born in 1916, underwent subtotal gastrectomy (Polya-Hofmeister) for a bleeding chronic duodenal ulcer in 1950. He was readmitted to hospital in July, 1953, with acute intestinal obstruction. At laparotomy a coil of small bowel was found to be kinked and adherent to the anterior abdominal wall at the site of the gastrectomy incision. The adhesions were separated and the torn serosal surfaces covered with peritoneum. Obstruction recurred on the seventh postoperative day. Laparotomy showed part of the ileum to be twisted, swollen, and œdematous, but still viable; two small perforations were closed, and the loop was excluded by means of a side-to-side anastomosis.

Onset of Symptoms

After this operation his stools were perceptibly looser than they had previously been; but he remained well till May, 1955, when he first noted cramps in the legs. His physician prescribed injections of vitamin B_{12}, in February, 1956, and these gave him fair relief. Towards the end of 1955 his appetite and food-intake increased greatly, but he lost 63 lb. in the eight months before admission.

During April, 1956, his health sharply deteriorated. He passed 6–15 pale, offensive, porridgy stools a day; his abdomen became distended; and he felt very weak and listless. His hair, normally brown, became red and stopped growing (he needed only one haircut in four months and rarely shaved). Body-hair fell out, leaving scanty red axillary and pubic hair. The nails of the fingers and toes ceased growing. His voice became hoarse, and libido was lost.

Investigations

Studies elsewhere at this time showed that the hæmoglobin was 8·8 g. per 100 ml. and that there was macrocytosis and poikilocytosis. The bone-marrow showed normoblastic erythropoiesis. The serum-albumin was 1·2 g. and the serum-globulin 1·8 g. per 100 ml. In August, 1956, during an attack of tetany, the serum-calcium was 7·0 mg. and the inorganic phosphorus 3·8 mg. per 100 ml. A well-functioning subtotal gastrectomy was seen on barium-meal examination; the barium enema was negative.

Treatment

Treatment with penicillin, streptomycin, tetracycline, and neomycin, and with prednisone, did not improve his condition. At laparotomy on Sept. 3, a gastrocolic fistula was sought but not found. His condition was poor, and a more thorough search was not made.

Two weeks later he was admitted to the Groote Schuur Hospital. He was very wasted, with a receding hair-line, dry reddish hair, and mild pellagrous skin changes. His tongue was bald and red, and he had cheilosis and angular stomatitis. There was no peripheral œdema. The cardiovascular and respiratory systems were normal; the blood-pressure was 110/80 mm. Hg. The abdomen was distended and bowel sounds were increased. The prostate gland was barely palpable and the testes were retracted and small. The legs were weak and tender on deep pressure, with decreased perception of pin-prick and absent ankle reflexes.

The urine was normal. The hæmoglobin was 10·5 g. per 100 ml., and the blood smear appeared normal. The serum-albumin was 3·1 g. per 100 ml. and serum-globulin 3·0 g., serum-cholesterol 98 mg. per 100 ml., and serum-alkaline phosphatase 7·1 Bodansky-Shinowara units. The blood-urea, serum-bilirubin, serum-electrolytes, and oral-glucose tolerance curve were within normal limits. Plain radiographs of the chest, abdomen, and vertebral column were normal. Barium-meal and barium-enema studies were again negative.

The electrocardiogram showed sharp T-wave inversion in leads V_1 to V_3, which improved within a week of the start of therapy. The basal metabolic rate was −10%. The stools were grossly fatty and contained no occult blood.

Discharge and Readmission

In view of the recent negative laparotomy, a blind loop was not seriously considered. Moderate improvement resulted from a low-fat, low-residue diet with vitamin B_{12}, folic acid, and multivitamin supplements, and he was discharged a month after admission. A relapse led to his readmission on Nov. 24, 1956. His legs were very painful, and evidence of peripheral neuritis had increased. His vision was poor, especially at night, and he was found to have pallor of the temporal halves of the optic discs. Photophobia was troublesome. The legs were moderately œdematous. The serum-albumin had fallen to 1·9 g. per 100 ml. and the serum-globulin was 2·3 g. A three-day fat balance (intake 70 g. a day) showed 62% absorption. Needle biopsy of the liver showed significant liver-cell damage in a regenerative phase (Dr. C. J. Uys).

Preparation and Operation

As the patient's condition had deteriorated, and a blind loop appeared to be the likeliest cause of the malabsorption, it was decided to search for it again. In preparation the patient was given a high-calorie diet, transfusions of blood and serum, and vitamin supplements. He was ravenous; on an average day the diet kitchen dispensed meals containing 528 g. of protein, 483 g. of fat, and 895 g. of carbohydrate, providing him with about 10,000 calories. In addition he ate whatever residue was available from the ward supplies. His vision improved, the skin lesions disappeared, the œdema decreased, and he gained a little weight, but his legs remained painful and weak. The serum-albumin rose to 4·2 g. per 100 ml.

At laparotomy (Dr. D. J. du Plessis) a short-circuited loop six feet in length was found, three feet from the ileocæcal valve. This was unpicked and normal continuity restored. His postoperative recovery was dramatic. His appetite became normal; the stools were well-coloured, formed, and less frequent; and he gained 35 lb. in the twenty-one days after operation. His hair became thick and dark brown, and after two weeks he had to shave every day. Axillary, pubic, and body hair also became profuse and darker, and his nails started to grow normally. His tongue was no longer red and smooth. Libido returned a month after the operation; after two months his prostate felt normal; the testes were normal in size and no longer retracted. Vision returned to normal, but pallor of the temporal halves of the discs has persisted.

Two months after the operation the electrocardiogram was completely normal, the serum-cholesterol was 273 mg. per 100 ml., the serum-albumin was 5·3 g. per 100 ml., and the serum-globulin 2·8 g. A fat-balance study showed 94% absorption. His sole remaining disabilities were due to the peripheral neuritis and were improving with physiotherapy.

Discussion

It has only recently been realised that the construction of blind loops of small intestine can produce steatorrhœa and megaloblastic anæmia. "Pernicious anæmia" due to a surgical fistula (between jejunum and ascending colon) was first reported by Little et al. (1929). Cameron et al. (1949a) reviewed 23 cases of macrocytic anæmia due to

intestinal anastomoses and 37 due to strictures of the small bowel; Halsted et al. (1956) brought the total for both types to 76.

Cameron et al. (1949b) showed in rats that construction of an intestinal loop that could fill with normal peristalsis, but not empty itself, produced macrocytic anæmia. This was true only of loops in the upper small bowel; yet in our case the site was in the lower ileum, and in others the communication has been between lower ileum and colon (Halsted et al. 1956).

It is believed that stagnation in such a loop leads to bacterial infection which spreads into and irritates the rest of the small intestine (Witts 1956). Sammons et al. (1956) have discovered a strain of *Streptococcus fæcalis* able to synthesise fats in vitro; such organisms thriving in a cul-de-sac may be able to divert vitamin B_{12}, folic acid, and other substances from the host. Presumably absorption is decreased from those areas of bowel irritated by the overflowing exudates, but Jackson and Linder (1951) believe that an additional "toxic" factor is necessary to produce a sprue-like syndrome. Stagnation is likewise thought to cause the malabsorption found in patients with jejunal diverticulosis (Badenoch et al. 1955) and intestinal strictures (Gardner 1957). In both the blind-loop syndrome (Halsted et al. 1956) and jejunal diverticulosis (Evans 1956), oral aureomycin has improved the absorption of ^{60}Co-labelled vitamin B_{12} from the gut, presumably by killing organisms that had been taking it up. Our patient had not responded clinically to antibiotic therapy (including a course of tetracycline).

An abnormal intestinal pattern is found on barium-meal examination in most cases of enterogenous steatorrhœa, but tends to be absent in the blind-loop syndrome (Gardner 1957), as it was in this case. Two years' delay between the operation and the development of anæmia is recognised (Halsted et al. 1956). In our case erythropoiesis was normoblastic at the time of bone-marrow examination, but he had received vitamin B_{12}.

Our patient could obviously make very little use of his colossal food intake. The appetite is often retained in steatorrhœa (Ingelfinger 1957), but such an increase is very unusual.

Many of the other features are uncommon or unknown in the malabsorption syndrome or in simple starvation. We can find no reference to such hair changes in steatorrhœa. In prisoners-of-war in Japanese hands (Smith and Woodruff 1951) and in experimental human starvation (Keys et al. 1950) hair was lost from the scalp, but neither reddening nor changes in the body-hair were reported. In a case of massive intestinal resection where signs of severe malnutrition developed the patient's body-hair regrew after the operation and he shaved daily (Jackson et al. 1951). The colour changes in the hair in our case seem analogous to those in kwashiorkor in infants with protein malnutrition (Brock and Autret 1952). Severe hypoproteinæmia is occasionally reported in idiopathic steatorrhœa (Adlersberg et al. 1957, Forshaw 1957), and is common when malabsorption is due to a bowel short-circuit (Cooke 1952).

The visual disturbance was thought to be due to retrobulbar neuropathy. Smith and Woodruff (1951) suggested that "deficiency amblyopia" was not due to beriberi or pellagra; the therapeutic response to vitamin A, aneurine, and nicotinamide was poor, but their patients did well on riboflavine-containing foods. Irreversible optic atrophy might develop in not less than six months.

The peripheral neuritis in our case was probably associated with aneurine deficiency, but pain in the feet and legs was unduly prominent and did not respond as well to therapy. Smith and Woodruff (1951) thought that this "burning-feet syndrome" was different from the polyneuritis of beriberi, and found that it did not improve on treatment with aneurine. The serial electrocardiographic changes are those often seen in "beriberi heart-disease" in Cape Town (Schrire and Gant, 1955). A return to complete normality is the rule, and the electrocardiographic changes may be the only manifestations of the cardiac involvement.

In Jackson et al.'s case (1951) libido was lost and erections stopped, but secondary sex characteristics were retained; at necropsy there was practically no spermatogenesis (Linder et al. 1953). In our patient the prostate gland and testes were small; they returned to normal once the loop had been unpicked. In rats, Addis et al. (1936) showed that starvation for seven days caused the loss of 29% of the protein content of the prostate, compared with 40% from the liver and none from the testes; perhaps the changes are similar in man. Stefko (1928) found that atrophy of the seminiferous tubules was rare in starved adults and thought that the testis resisted starvation better than the ovary. Unfortunately 17-ketosteroid assays and testicular biopsies were not done in our patient.

Summary

A case is presented of iatrogenic steatorrhœa, due to a surgically-constructed blind loop in the ileum. Two years after this operation extremely severe signs of malabsorption developed, with hypoproteinæmia, reddening of the hair, retrobulbar neuropathy, peripheral neuritis, and sexual changes. Operative correction of the abnormality of the bowel led to rapid and almost complete resolution of the secondary defects.

We are grateful to Dr. L. Mirvish and Dr. R. L. Tobias for their interest and advice, and we thank them and Dr. N. H. G. Cloete, medical superintendent, Groote Schuur Hospital, for permission to study and publish this case. This study was aided by a grant from the Cape Town city council.

ADDENDUM

Temporary redness of the hair has been described by S. M. Mellinkoff (*Amer. J. digest. Dis.* 1957, **2**, 738) in a case of ulcerative colitis: the patient's hair turned red with malnutrition and returned to its normal brown colour when his general condition improved. Peripheral œdema and hypoproteinæmia (serum-albumin 2·5 g. per 100 ml.) were present.

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Preliminary Communication

POLIOVIRUS TYPE 1 ISOLATED FROM A BUDGERIGAR

ALTHOUGH numerous animals, including dogs, cats, and even moles,[1] have been named as possible reservoirs of poliomyelitis virus, confirmatory evidence from the laboratory has always been lacking. Possible avian reservoirs were suggested when a time relationship was observed between outbreaks of fowl paralysis and the human poliomyelitis epidemic in South Africa in 1948,[2] but no association was proved.

We describe here an incident in which there seems little reason to doubt that a budgerigar became infected with poliovirus type 1 and excreted this virus for at least three weeks. The main purpose of this preliminary communication is to draw attention once more to the possibility of transmission of poliomyelitis by domestic pets.

The budgerigar in question came into contact with a boy aged 9 on Aug. 15, 1957, at which time the bird was recovering from paralysis of its legs. This bird was allowed out of its cage, and once took hold of the boy's lip with its beak and held on to him until it was removed by the boy's mother. Another bird which had been kept in the same cage had died from a similar attack of paralysis a few days earlier. The child became ill on Aug. 22, developed signs of bulbar poliomyelitis on Aug. 24, and died four days later. Type-1 poliovirus was recovered from his stool.

The possibility of an association between the illnesses of the birds and the boy first prompted examination of droppings from the bird about mid-September. Culture of this material in HeLa cells yielded poliovirus type 1. The possibility of accidental laboratory contamination was excluded when the same virus was isolated from the same specimen of droppings by a different worker in a different laboratory.

On Oct. 7 a second sample of droppings examined in HeLa cells yielded poliovirus type 1. On the same day the budgerigar was killed and the intestinal contents, collected at necropsy, were examined in HeLa cells. Poliovirus type 1 was again isolated. In each instance the cytopathogenic effects of the virus were observed in the first passage. Unfortunately it was not possible to obtain serum from the bird for antibody assay.

The viruses were identified by neutralisation tests in HeLa cells using high-titre antiserum prepared in monkeys against standard strains of poliovirus types 1, 2, and 3. No difficulty was experienced with the neutralisation tests and the viruses behaved like any other strains of poliovirus type 1.

To exclude the possibility that the monkey antiserum to poliovirus type 1 which was used to identify each virus contained additional antibody to an agent other than poliovirus, a rabbit antiserum was prepared against the virus isolated from the intestinal contents of the bird at necropsy. The rabbit antiserum neutralised the standard strain of poliovirus type 1 (Mahoney) maintained in this laboratory and also neutralised each virus isolated from the budgerigar. The antiserum did not neutralise either type-2 or type-3 poliovirus.

SUMMARY

Four identical viruses were isolated from three specimens (two of droppings and one post-mortem intestinal content) obtained from a budgerigar which recovered from a paralytic illness. Each agent has been identified as poliovirus type 1. A similar virus was recovered from a boy who died of poliomyelitis which developed seven days after contact with the paralysed bird.

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Medical Societies

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE

Malnutrition and Pathogenesis

AT a meeting in London on Feb. 20, with Brigadier J. S. K. BOYD, the president, in the chair, the relationship of malnutrition to pathogenesis was discussed.

Prof. B. S. PLATT said that it had long been known that the onset of beriberi was often related to a pathological event such as a non-specific bout of fever, and that many of the signs associated with malnutrition were non-specific and were due to non-dietary factors. Malnutrition was disordered nutrition and was manifested by disturbances of growth, maintenance, and repair of the whole body or its tissues and organs; it might not always be due to dietary defects, but might in parts of the body be due to local disturbances of the circulation.

Professor Platt related the general adaptation syndrome of Selye to malnutrition. The effects of the stressor, which might be an infective agent, occurred in three stages: alarm reactions, the stage of resistance, and the stage of exhaustion. In these reactions the central nervous system and the endocrine system were fundamental. Observations in Gambia indicated that protein intake would probably be adequate if it were not for anæmia and parasitism. Infant mortality was very high, and this was probably at least partly related to low-protein diet; it was therefore important in the interests of the child to ensure that lactation was not ended too quickly, though lactation imposed a strain on malnourished mothers.

Professor Platt cited experimental work showing that gastric ulcer and fibrosis of the liver can be induced by a diet poor in protein and that fatty livers can be produced by imbalance of hormones. Arrested growth-lines in bones were common and could be related to illnesses such as measles and whooping-cough, which persisted longer if the nutritional state was poor; and these lines had also been found to be due probably to dietary inadequacy. The importance of this conception of interrelationship between malnutrition and the stresses due to other causes was partly that in many malnourished communities more might be achieved by eradication of parasites than by increased food-supplies, and partly that attention should be given to the balance as well as to the level of nutrients.

Dr. G. R. WADSWORTH remarked that anæmia could not adequately be defined in terms of the hæmoglobin concentration of peripheral blood, but should be defined in terms of total hæmoglobin and metabolically active tissue. The internal environment consisted of the vascular and extravascular fluids, the amount and composition of which

were affected by endocrine influences, and derangement of these might be responsible for spurious anæmias in malnutrition. On the other hand (as occasionally in pellagra) hæmoconcentration might mask true anæmia. A body nutrient pool might be postulated into which absorbed nutrients entered, and which was drawn on during the various metabolic processes controlled by hormones. Competition for nutrients existed between different tissues. There might be circumstances in which the hæmopoietic tissue suffered and anæmia resulted; but hæmoglobin formation seemed to have priority for available protein.

Dr. L. A. ELSON described the effect of "butter yellow" in promoting in rats cirrhosis of the liver and subsequent cholangioma and hepatoma, and the protection against such new growths provided by a high-protein diet. Such protection was greater in a fast-growing strain of rats with a high capacity for tissue synthesis and repair than in a slow-growing strain. A carcinogen with dietary deficiency produced conditions favourable to cirrhosis and tumour formation, and this combination of factors might occur in Africa—the carcinogens were not yet known, though chillies had been incriminated in experimental work.

Dr. P. M. D'ARCY HART said that for protection against tuberculosis dietary protein was important. Recent work in India indicated that chemotherapy might be as successful at first in the malnourished as in the well-nourished, but that for the development of bodily resistance to the disease adequate nutrition was essential. A social and nutritional policy should be integrated with a programme of chemotherapy.

Dr. S. BELL commented on the failure of adrenal function in anæmias observed in West Africa, and to experimental work indicating that corticoids had a protective action on the liver against injected toxic substances and also probably against other stress factors.

ROYAL SOCIETY OF MEDICINE

Epidemiological Risks of Antibiotics

THE Section of Epidemiology and Preventive Medicine met on Feb. 21, with Dr. IAN TAYLOR, the president, in the chair.

Dr. E. J. L. LOWBURY said that the downward trend in the collective death-rate from infective and parasitic diseases had begun before the introduction of antibiotics, but had been steadier since, and for some (e.g., erysipelas) the fall was initiated at that time. The pattern varies from one disease to another; in some the number of notifications has stayed the same, or even increased, but the number of deaths has fallen. The emergence of drug resistance had been noted in the last century, but with the use of antibiotics a new phenomenon was observed: the prevalence of resistant strains and of certain phage-types of organisms in hospitals reflects the use of drugs there. There have been reports of increased postoperative sepsis in late years, and the organisms are usually resistant to antibiotics; advances in, for instance, chest surgery, have been jeopardised. It may be that patients with low resistance to *Staph. aureus* are nowadays kept alive by other treatment, but there has probably been an increase in virulence, especially in staphylococci of phage-type 80.

In the burns unit of the Birmingham Accident Hospital, patients are nursed in two open wards, though there are some cubicles and an air-conditioned dressing-station. The organism giving most concern is the *Streptococcus pyogenes* because it usually causes grafts to fail; but staphylococci are also important, partly because some strains produce penicillinase and prevent penicillin from eliminating the streptococci (though no penicillin-resistant streptococci have been isolated). On several occasions, when a drug was introduced, resistant staphylococci emerged in a patient under treatment, and the proportion of resistant strains in the wards gradually rose; but when the drug was no longer used, the proportion fell, though at rates which varied from one occasion to the next. This was true of tetracycline, erythromycin, and novobiocin. The frequent appearance of resistant strains in patients who have been given none of the drug indicates cross-infection.

Tetracyline-resistant streptococci of group A emerged in patients under treatment five years ago, and recently erythromycin-resistant strains have appeared; more than one serotype is involved. Of the possible remedies, drug combinations (e.g., erythromycin and novobiocin), though therapeutically valuable, have not prevented the emergence of resistant organisms, and aseptic technique must be improved.

Answering questions, Dr. Lowbury said that nasal carriers should probably be treated only when the strain present is of an epidemic type (e.g., phage-type 80) or is causing a current outbreak of sepsis. Significant resistance of *Staph. aureus* to chlorhexidine ('Hibitane') is rarely if ever seen. In the treatment of nasal carriers, chlorhexidine is more effective if combined with neomycin. He believed that when a given strain of organism becomes resistant during treatment, the mechanism of change, which varies with the organism and the antibiotic, is sometimes a mutation, but usually replacement by a resistant strain. In burns he has found that strains of *Clostridium welchii* are always sensitive to penicillin.

Dr. J. B. SELKON described a survey carried out in Britain by the Medical Research Council tuberculosis research unit to discover the incidence of resistant tubercle bacilli in untreated patients. Sputum was sent to a central laboratory from 1404 patients in whom pulmonary tuberculosis had been newly diagnosed at 80 chest clinics. Mycobacteria were found in 974. 94·9% of the bacilli were sensitive to streptomycin, isoniazid, and *p*-amino-salicylic acid (P.A.S.). Of the 44 resistant strains of *Mycobacterium tuberculosis* var. *hominis* or *bovis*, 22 were resistant to streptomycin, 21 to P.A.S., and 7 to isoniazid. The proportion of resistant strains was higher in women under 35 than in men or in older women, though the proportion of recent contacts was the same. The explanation may be that clinical manifestation is more often due to recent exogenous infection in young women than it is in the other groups; if so, we may expect that in future the proportion of resistant strains in all new cases will be similar to that in this group (about 9%).

Dr. H. WILLIAM SMITH, of the Animal Health Trust, said that in veterinary practice resistance is most important in the strains of *Escherichia coli* causing diarrhœa in young calves and pigs (scouring). The frequent use of antibiotics in some herds has resulted in the emergence of a fæcal flora of *Esch. coli* that is predominantly antibiotic-resistant; this has greatly complicated therapy. About half of all pigs in Britain are now fed antibiotics, and at the bacon factories in 36% of the animals all the *Esch. coli* strains isolated are resistant, and in 38% some are resistant. When resistance appears in a herd after feeding of

antibiotics, it tends to persist even when the drug is stopped. The position with *Clostridium welchii* is different in that, though resistant strains appear, the organism is completely eliminated in some specimens from animals in which high concentrations of antibiotics have been fed.

Among the speakers in the discussion was Dr. MARY BARBER, who said that penicillinase-producing staphylococci were hard to produce in the laboratory, but she thought she had done so by exposing staphylococci to minute concentrations of penicillin for some years.[1] The concentrations were similar to what might be expected in the air where penicillin was being used, or in tissues for very long periods after penicillin treatment.

Reviews of Books

The Lower Urinary Tract in Childhood

S. R. KJELLBERG, N. O. ERICSSON, ULF RUDHE, pædiatric Clinic, Karolinska Sjukhuset, Stockholm. Chicago: Year Book Publishers. London: Interscience Publishers. 1958. Pp. 298. £6 6*s*.

BASED on clinical and radiological studies of over 1000 children with disease of the lower urinary tract, this book will appeal not only to those engaged in pædiatric urology but also more widely, as a reminder of the possible role of organic lesions in urinary disorders in childhood. It gives an impressive lesson in how to recognise these lesions by careful urographic investigation. After an introductory section on embryology and normal anatomical development, the book is largely devoted to a series of cystourethrographic studies, with the incidental text often interrupted by several pages of illustrations. The illustrations, however, demonstrating various obstructing lesions and their effect on the urinary tract, are so excellent that the book is well worth a place in the library of any radiological department.

The Epileptic Seizure

COSIMO AJOMONE-MARSAN, M.D., BRUCE L. RALSTON, M.D., National Institute of Neurological Diseases and Blindness, Bethesda, Maryland. Springfield, Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1957. Pp. 251. 45*s*.

DETAILED observation of the clinical and electrical accompaniments of an epileptic attack are all-important in diagnosis. Opportunities to make such observations are greatly increased if attacks can be induced at will. In this book the authors describe their experience with leptazol-induced convulsions in 119 cases. They feel justified in submitting almost all seizure patients to this procedure " as part of their complete study "—a view with which most neurologists in this country would probably disagree. They consider that the induced fits truly represent the spontaneous seizure, since in only 5% of cases did the leptazol produce attacks not clinically similar to the spontaneous ones.

Having satisfied themselves on this point, they give their detailed findings, both clinical and electrical, of the aura, the fit itself, and the post-ictal phase, in these induced seizures. The result is an extremely interesting and valuable contribution to the study of the epileptic process. It is of interest to see how, as a result of such studies, the specificity of 3-per-second wave-and-spike activity in clinical petit mal is melting away. The authors also record instances in which an undoubted clinical seizure was accompanied by no detectable change in the resting electrical activity of the cortex—an observation with considerable theoretical and practical implications.

They not only attempt a correlation between clinical seizure patterns and the site of origin and progress of electrical abnormality, but they also use their evidence to suggest pathways of election for the propagation of the initial discharge to other parts of the brain. The book could be made more useful by a slightly fuller index, particularly of the authors' own " shorthand " for various types of fit, and by page references to charts, &c., when they are referred to at a distance in the text. These are small points, and, in general, the book contains much information important to all who have to treat epilepsy and to those who are interested in the way the brain works.

1. Barber, M. *in* Drug Resistance in Microorganisms (edited by G. W. Wolstenholme and C. M. O'Connor). London, 1957.

The Story of Peptic Ulcer

RICHARD D. TONKIN, M.D., F.R.C.P., senior physician to Westminster Hospital, London. Philadelphia and London: W. B. Saunders. 1957. Pp. 71. 16*s*.

THIS charming account of ætiological factors in peptic ulcers and how to handle them was born, the author says, of the tedium of endlessly repeating the same advice to countless sufferers. It is illustrated by Ray Hellier's very humorous drawings. After a single reading one is left with the feeling that one knows all about peptic ulcers and how to treat them. The awkward complications of peptic ulcers are tactfully omitted. The contentious question of ætiology is glossed over and the treatment recommended is uncomplicated and reassuring. It would be interesting to learn whether patients find this short work helpful; it certainly seems worth a try, although the price is forbidding.

Dr. Tonkin has not apparently considered that his book might have a place in the teaching of nurses and medical students : presumably it is not dry enough, and it might start a fashion for small readable booklets which could present the essence of a subject in a highly assimilable form, so that students might master the important points in an hour's easy reading. That might be one way of finally dispelling the view that medical teaching was meant to be dull and that students and nurses were born to suffer.

Cardio-charting

Universal Method of Recording Heart Auscultation. ARTHUR BRISKIER, M.D., senior clinical assistant physician and cardiologist, Mount Sinai Hospital, New York City. New York and London: Macmillan. 1957. Pp. 58. 42*s*.

THIS is a beautifully produced and illustrated monograph of 50 pages about cardiac auscultation, and Dr. Briskier rightly emphasises the need for some method of accurately noting the clinical findings. Many physicians make a drawing of the sounds and murmurs with a grading of intensity, and to this the author wishes to add some musical connotations and different colours for sounds and murmurs. Unfortunately he has not taken account of the considerable advances that have lately been made in the knowledge of cardiac hæmodynamics. The third heart sound is attributed to ventricular contraction, presystolic murmurs are said to continue in the presence of atrial fibrillation, a calcified and narrow aorta is held to produce a loud harsh mid-diastolic murmur, and pulmonary stenosis is described as usually accompanied by a diastolic murmur. By thus failing to keep his book in line with the latest observations in this complicated subject Dr. Briskier has lost an opportunity to provide a practical guide that many cardiologists would welcome.

Handbook of Neurological Examination and Case Recording (Cambridge, Mass.: Harvard University Press. London: Oxford University Press. 1957. Pp. 114. 22*s*.).—In this revised edition, the general body of Prof. D. Denny-Brown's small handbook remains an excellent guide for the beginner. The section on psychiatric examination seems long, especially since the author excuses himself from introducing new material on the grounds of space. The supplementary investigations have a rather old-fashioned ring. This is partly because of the absence of cerebral angiography: space devoted to details of lumbar puncture and air encephalography (incidentally, how many clinics still indulge in complete air replacement?) could have been profitably sacrificed in favour of angiography. The accounts of examination for aphasia, agnosia, apraxia, and perceptual disorders are particularly well done and will be useful to the practising neurologist as well as to the student.

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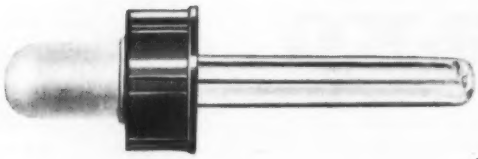

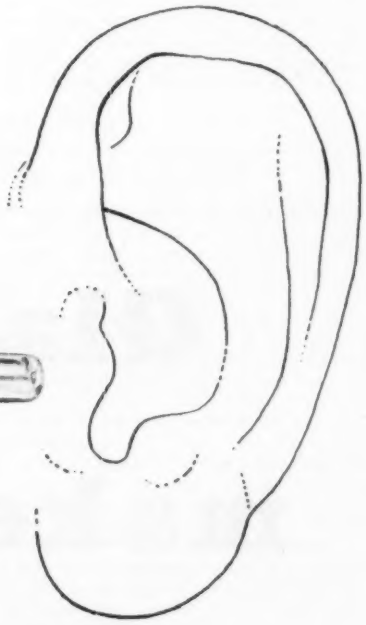

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THE LANCET
LONDON 8 MARCH 1958

Resistant Staphylococci in Hospitals

WE are continually reminded that antibiotic-resistant staphylococci abound in hospitals,[1 2] and that their prevalence and character constitute a perpetual danger of infection among both patients and staff.[3–6] The latest such warning is contained in the striking report by Mr. SLANEY and Mr. BROOKE which appears this week on p. 504. Nasal carriers of staphylococci among patients and staff have received a good deal of attention, and the high proportion of them has possibly tended to create a feeling that their control may be beyond our present methods and resources. It is interesting, therefore, to find that CASWELL et al.[6] are a little inclined to question the role of the nasal staphylococcus carrier in the spread of infection within a hospital.

In their hospital in February, 1956, there was a notable rise in the number of clean surgical wounds showing infection, and when accurate recording of the results was instituted the infection-rate was found to be around 5%. Vigorous aseptic measures were instituted, and the rate of infection in clean surgical wounds fell to between 0·8 and 1·5%, at which it remained for the ensuing ten months. About half the infections in this outbreak were found to be due to one phage type of staphylococcus, given as 42B/52/81, which is probably the same as, or a near relative of, the notorious types 80 and 81. At the same time as the outbreak of wound infection was observed, there was a sharp rise in cutaneous staphylococcal infections among hospital staff; and the two series of infections declined together. Of the infections among staff, 64% involved forearm, hand, or face. Members of the staff with infections were at once taken off duty and were not allowed to return until cured. In this outbreak only 4% of 256 nasal carriers among a staff of 640 actually harboured the epidemic type of staphylococcus, which was responsible for 50% of the surgical wound infections, 76% of the cutaneous abscesses acquired by patients, and 80% of the typed staphylococci from hospital staff. As regards the different possible means of spread of infection in the outbreak which they studied, CASWELL et al.[6] were more impressed by the importance of direct contact than of nasal carriers or airborne dissemination. They refer to several instances in which certain areas of the hospital were free from infection with the epidemic type of staphylococcus until members of staff were found on duty with active infection with the responsible type. MCDONALD and TIMBURY[7] recently showed how effective and dangerous a method of transmission this may be, and the same conclusion may be drawn from the observations of BARBER and BURSTON.[8]

Along with strict treatment of lesion-carriers among the staff, CASWELL et al.[6] naturally tightened all hospital aseptic routines, and (as they remark) it is difficult to tell which of these steps was the most important. JEFFREY and SKLAROFF[9] have reported that serious infection developed in 10% of 673 clean wounds in a hospital in this country. It is vital that we should not come to accept rates of this kind as inevitable. One important essential, no doubt, is to revert to the strict observance of aseptic methods which characterised the days before modern chemotherapy. CLARKSON believes that in the operating-theatre discipline has slackened in the past twenty-five years[10]; and if it is true that the aseptic conscience of doctors and nurses has become less sharp, we are certainly in danger of doing great harm. Also, notwithstanding the doubts expressed by CASWELL et al.[6] on the role of nasal staphylococcus carriers in their particular experience, it must remain an object of hospital practice to reduce their incidence. Even a few carriers of an epidemic type of organism can give the organism a fair send-off on its way.

Happily there is some new light on this problem. On p. 489 of this issue Dr. GOULD offers evidence on how hospital inhabitants may become carriers of resistant staphylococci. He shows that there is substantial and widespread dissemination of penicillin particles in hospital air, and that the drug may be spread by droplets and dust. In this way it will be inhaled by all who breathe hospital air, and may reach a high enough concentration in the anterior nares to eliminate the normal penicillin-sensitive staphylococci and so leave the penicillinised nose as a clear field for occupation by resistant staphylococci transmitted from the staff, many of whose noses carry such organisms. Moreover, Dr. MARY BARBER has found some evidence that long-continued exposure of staphylococci to such minute concentrations of penicillin as may be present in air can lead to the emergence of penicillin-destroying organisms (see p. 514). Dr. GOULD shows that penicillin was most abundant in the air of rooms where penicillin was being made up in solution or given to patients—that is, in dispensaries, wards, and outpatient treatment rooms. Now that he has drawn attention to this undesirable contamination of hospital air with penicillin, there appears to be a good case for considering whether we should prepare antibiotic solutions, and clean the syringes with which they are injected, under cover of ventilated cabinets, such as that recommended by WILLIAMS and LIDWELL[11] for handling infective material in laboratories. Besides

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2. Petersdorf, R. G., Curtin, J. A., Bennet, I. L., Jr. *Arch. intern. med.* 1957, **100**, 927.
3. Schwabacher, H. *Mon. Bull. Minist. Hlth Lab. Serv.* 1958, **17**, 23.
4. *Lancet*, Feb. 1, 1958, p. 250.
5. *ibid.* Feb. 8, 1958, p. 301.
6. Caswell, H. T., Schreck, K. M., Burnett, W. E., Carrington, E. R., Learner, N., Steel, H. H., Tyson, R. R., Wright, W. C. *Surg. Gynec. Obstet.* 1958, **106**, 1.
7. McDonald, S., Timbury, M. C. *Lancet*, 1957, ii, 863.
8. Barber, M., Burston, J. *ibid.* p. 578.
9. Jeffrey, J. S., Sklaroff, S. A. *ibid.* Feb. 15, 1958, p. 365.
10. Clarkson, P. *ibid.* Feb. 22, 1958, p. 428. See *ibid.* Feb. 8, 1958, p. 301.
11. Williams, R. E. O., Lidwell, O. M. *J. clin. Path.* 1957, **10**, 400.

possibly increasing the number of nasal carriers of drug-resistant staphylococci, inhalation of penicillin bears the risk of sensitisation. WELCH et al.,[12] as a result of a nation-wide survey of the U.S.A., have shown how serious a problem this is becoming, and have concluded that of all the antibiotics penicillin produces the most numerous and the most severe sensitisation reactions. Nurses and pharmacists are perhaps exposed more than any others to this risk; but it should be added to the considerations which we weigh before prescribing any antibiotic.

The responsibility for deciding whether to give an antibiotic, and which one to give, is rather often too casually delegated. Bacterial infections in hospital and elsewhere are far more likely to be controlled by rigid asepsis, intelligent hospital organisation, thoughtful immunisation procedures, and rational chemotherapy than by the prevalent and ill-judged attempts to " hit the bugs hard ". We should ponder the reproach of a man who in his day was one of our most active critics—the late GEORGE BERNARD SHAW.[13] He deplored the coming of a generation of doctors " which having heard of microbes much as St. Thomas Aquinas heard of angels, suddenly concluded that the whole art of healing could be summed up in the formula: Find the microbe and kill it. And even that they did not know how to do."

Blood-groups and Disease

THE idea that blood-groups may be associated with particular kinds of disease is not new[14]; but except for the discovery of maternal-fœtal incompatibility as the cause of hæmolytic anæmia of the newborn, the findings were largely inconclusive until 1953 when AIRD et al.[15] described an extensive survey of the distribution of the ABO blood-groups in patients with cancer of the stomach. These workers found that in such patients blood-group A turned up significantly more often than in a comparable series of controls. This result stimulated the search for other such associations. The most striking to be brought to light was the relatively high frequency of blood-group O in patients with duodenal ulcer and to a lesser extent in patients with gastric ulcer.[16-22] Associations have also been reported between group A and pernicious anæmia,[23] group A and diabetes mellitus,[24 25] group O and pituitary adenoma,[26] group A and tumours of the salivary gland,[27] and group A and portal cirrhosis.[28] A low frequency of group O has been noted in infants dying with bronchopneumonia.[29] On the other hand no associations have been detected between the ABO blood-groups and cancer of the rectum and colon, cancer of the breast, cancer of the lung, and hypertension.[16 30-33] FRASER ROBERTS[14] concludes that the evidence for the association between blood-group O and both duodenal and gastric ulcer, and between blood-group A and cancer of the stomach and also pernicious anæmia, is exceedingly strong and that these associations are real. He considers that, as regards most of the other reported associations, the findings, though highly suggestive, need further confirmation. CAMERON[27] has since described a remarkable series of patients with tumours of the salivary tissues. The association with blood-group A was pronounced, and this may prove to be the clearest association yet encountered.

So far most of the work in this field has been concerned with the ABO blood-group system. There are some data on the Rh system, but hitherto no clear-cut associations have been detected. Little or nothing is as yet known about possible associations between particular diseases and most of the other blood-group systems; but CLARKE et al.[34] have investigated the frequency of the ability to secrete ABH group specific substances in duodenal ulcer. People can be classified into " secretors " and " non-secretors " according to the reaction of their saliva with reagents which detect the antigenic specificities peculiar to individuals of different red-cell ABO groups. This difference is inherited independently of the inheritance of the ABO blood-groups, but is obviously intimately associated with them physiologically. It was found that about 35% of patients with duodenal ulcer were " non-secretors ", compared with about 24% of controls.

Each of the positive associations has been discovered by comparing the blood-group frequencies in patients with a particular disease with the frequencies in what was believed to be a random sample of the population from which the patients were derived. The associations thus detected have usually been taken to signify that people with a particular blood-group are more susceptible to a particular disease than are others. But there is another possibility. A significant difference between the blood-group frequencies in patients and in controls might arise from some subtle differences in sampling due to unrecognised stratification of the population. Thus if in a particular population there were two groups of people with different origins, one of whom happened to have a relatively high frequency of blood-group O and also a high incidence of duodenal ulcer, and the other a relatively high frequency of

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blood-group A and a low incidence of duodenal ulcer, an association between group O and duodenal ulcer would appear to exist if the whole population was considered together, but might be not found to exist if each group could be considered separately. This is an awkward difficulty; but it can be overcome by comparing the blood-groups of patients with the particular disease with those of their brothers and sisters. By typing whole sibships a representative control is built into the investigation in such a way as to avoid sampling peculiarities due to unrecognised population stratifications. A positive association obtained in this way must certainly signify physiological interrelation of the two characters. Adopting this method, which is extremely laborious, CLARKE et al. confirmed their earlier finding that "non-secretors" of ABH substance are more frequent in duodenal-ulcer patients than in controls [34 35]; but, in the 293 sibships studied, they did not confirm the association between duodenal ulcer and blood-group O.[34 36] This finding, however, is equivocal because (as FRASER ROBERTS has pointed out) the observed figures do not differ significantly either from those expected on the hypothesis that the association observed by comparing patients with separate controls is attributable to population stratification or from those expected on the assumption of true association. Further data should dispel this uncertainty. Meanwhile the association between blood-group O and duodenal ulcer has been observed in straight surveys carried out in centres as diverse as London,[16] Copenhagen,[19] Vienna,[21] and Iowa[22]; and it is difficult to believe that the same sort of stratification would occur in each of the very different populations served by these centres.

So far, except for the association between duodenal ulcer and "non-secretion" of ABH substances, no association has been confirmed by sibship studies. Nevertheless, it seems likely that at least some of them reflect true predisposition to disease. It has long been known that substances with A and B blood-group specificity are not peculiar to the red-cell surface: they can also be demonstrated in cells in most other tissues in the body, and they are often present in large amounts in the mucous secretions. It therefore seems reasonable to suppose that significant differences in predisposition to specific diseases may depend more or less directly on the particular character of these antigenically specific substances present in different people. Such a possibility is perhaps particularly likely in associations between blood-groups and conditions such as carcinoma of the stomach, peptic ulcer, and salivary-gland tumours, where lesions arise in regions where mucous secretions containing blood-group substances are formed. It has been suggested, for example,[37] that the presence of A substance in the stomach and duodenum may afford relatively greater protection against peptic ulcer, but rather less against carcinoma of the stomach, than do the other substances.

Besides substances which have A and B group specificity several other closely related substances are common in mucous secretions and in tissue cells. One of these is H substance, which is particularly prominent in people of blood-group O but may also be found in people of other ABO genotypes. H substance is thought not to be a specific product of the activity of the O gene, but to be a kind of precursor of the A and B substances. Nearly everyone exhibits A, B, or H serological activity in some combination on their red cells, and also in many tissue cells; but in only about 75% of people are substances with these serological properties present in the secretions. These 75% are said to be ABH "secretors", and the other 25% ABH "non-secretors". Whether a person is an ABH secretor is apparently determined by a pair of genes at a chromosomal locus independent of that which determines the ABO blood-groups. The situation is further complicated by the occurrence of another blood-group specific substance known as Le^a, the formation of which probably depends on a gene at yet another chromosomal locus. About 90% of people have Le^a substance in their secretions, and this seems to be true both for ABH secretors and for ABH non-secretors.[38 39] But Le^a-positive people who are ABH non-secretors secrete much greater quantities of Le^a than do those who are ABH secretors.[39] Thus nearly all people have one or more of these four kinds of serological specific materials in their secretions, and the particular ones present and their relative amounts seem to depend on genes at at least three independent chromosomal loci. Further studies of associations involving the ABO groups and specific diseases must ultimately include ancillary studies of the secretor/non-secretor differences and of the occurrence of Le^a in the secretions. This kind of information will be important in assessing any hypothesis relating predispositions to disease to the blood-group substances or their mode of formation.

So far little is known about the biosynthesis of these substances; but in the past decade considerable progress has been made, notably by MORGAN and his colleagues, in determining their chemical constitution. These workers have isolated substantially homogeneous preparations of the A, B, H, and Le^a substances, and have shown that they are all complex mucopolysaccharides with rather large molecular weights. The different substances resemble each other very closely in physical properties, chemical composition, and overall structure.[40] The clear-cut differences in antigenic properties are thought to be determined by relatively short oligosaccharide sequences, probably located at the periphery of the molecule. These differences are evidently rather subtle, and what is known about their chemical basis does not yet indicate how they may be functionally significant or likely to influence the development of pathological processes.

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Annotations

POLIOMYELITIS VIRUS FROM A BUDGERIGAR

THIS week we publish on p. 512 a most unusual and tragic story. Two budgerigars kept in the same cage became ill with a paralytic disease within a few days of one another. The first bird died. The second bird was recovering from paralysis of its legs when it was allowed out of its cage. At this time it took hold of the lip of a 9-year-old boy by its beak, and held on to him until it was removed. Seven days later the boy became ill; bulbar poliomyelitis developed, and he died. Type-1 poliomyelitis virus was recovered from his stool. The bird's droppings were examined two weeks and five weeks after the boy died, and at the time of the second sample the bird was killed and a sample of its intestinal contents taken. From all three specimens type-1 poliomyelitis virus was isolated. Dr. Sommerville and his colleagues draw attention to the possibility of transmission of poliomyelitis by domestic pets; and the implication of their paper is that the budgerigars became infected with poliomyelitis virus, that one of the birds excreted virus for some weeks, and that the boy was infected by a bite from this bird. This is not the only possible explanation for these findings, but any other explanation would require a series of strange coincidences to explain all the facts.

Undoubtedly these findings merit most careful investigation. In the past few years the epidemiology of poliomyelitis has been intensively studied, but no sound evidence has been produced that under natural conditions any animal other than man becomes infected with poliovirus. It is possible, therefore, that the conclusion suggested by the report of Sommerville et al. will be received with some scepticism. Yet it is well to recall that not long ago poliomyelitis virus was thought to be strictly neurotropic, capable of infecting primates only. It is now clear that it can be cultivated in vitro in diverse primate cells, and recently it has been grown in "transformed" cells of rabbit kidney [1 2] and of the chick chorioallantoic membrane.[3] Some strains of poliovirus can also be passaged serially by the intracerebral [4] and intraspinal [5] routes in rodents, and in the chick embryo.[6] There is therefore no fundamental reason why polioviruses should not infect budgerigars, although this property might be confined to only a few strains of virus. If this can be established experimentally a whole new facet of the epidemiology of poliomyelitis will need to be reinvestigated.

"EPIDEMIC PLEURISY"

IN 1955 the Turkish Army was affected by an epidemic of an unusual acute respiratory illness.[7] There were 559 cases in a garrison force of about 2000; the incidence was greatest in March to June, and there was a further small outbreak in October to December. The illness began suddenly with fever, malaise, cough, and slight sputum, which in almost half the cases was blood-tinged. Fever lasted only four to five days; but the cough and other symptoms persisted, and few men were fit to return to duty under three months. In every case there was a small pleural effusion, the fluid being sterile by the ordinary laboratory tests and the cells predominantly monocytes. Intraperitoneal injection of the fluid into animals produced changes in the lungs—diffuse peribronchiolar infiltration with leucocytes and macrophages, and hæmorrhages. Serological tests for Q fever and influenza were negative. Less than half the patients could be radiographed, and in only 5% of these was the shadow of an effusion seen. The lung fields otherwise appeared normal.

The cause of the illness is unknown; but there was no evidence that it was tuberculous. It differed clinically from Bornholm disease and "acute benign dry pleurisy". Apparently no other epidemics were present at the time, but it is not clear whether there were in fact no cases of similar respiratory illness without effusions. The amount of fluid in the pleura was very small, and we cannot be sure that in other outbreaks of respiratory infections there have not been similar effusions, unless these were sought by thoracentesis.

TOWARDS SAFER AORTIC RESECTION

CLAMPING the aorta can be dangerous, for several reasons. Except where there is already a free collateral circulation, as in coarctation, complications in the spinal cord are caused by arrest of its circulation; the kidneys too are sensitive to any such deprivation of their blood-supply as would result from clamping the proximal aorta long enough for the surgeon to perform one or more arterial anastomoses. Only when the lesion to be resected allows the upper clamp to be applied below the level of the renal arteries can the operation proceed without special measures to protect kidneys and spinal cord from ischæmic damage, or without an undue haste which is in itself dangerous.

Fortunately, with the decline in late syphilis, thoracic aortic aneurysms are becoming rarer; but high-speed transport has brought a new source of aortic damage—the tear due to deceleration. In most cases of traumatic rupture the tear is at the point where the arch joins the descending aorta, probably because the lower part, lying more freely, can jerk forward at the moment of impact.[1] Teare [2] found this in nearly a third of the victims of an air disaster. As with other arterial injuries, if the patient does not die at once from hæmorrhage an aneurysm may form, quite silently, over the ensuing months or years. The condition will be recognised at routine chest X-ray examinations, or later when pain in the chest or other symptoms of compression develop. Once aneurysm is diagnosed, surgical treatment must be offered; and this now consists in excision and arterial grafting.

Attempts to reduce the danger to the spinal cord and kidneys at operation have taken various forms. Lowering their metabolic needs by induced hypothermia has been tried successfully,[3 4] while the idea of maintaining the aortic flow itself by intubation [5] or shunt [6] has much to recommend it. Extracorporeal circuits are now in fairly general use, as a means of providing rapid hypothermia [7]

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6. Clatworthy, H. W., Varco, R. L. *Proc. Soc. exp. Biol., N.Y.* 1950, **74**, 434.
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or of by-passing the heart itself.[8] Gerbode et al.[9] review thirteen published cases and add four new ones in which a pumped shunt was successfully used to conduct the circulation in the lower aorta. One of the four patients died in the postoperative period from renewed hæmorrhage at the operative site; he had been given heparin and had required fairly extensive pleural dissection to expose the aneurysm. The others all did well. In these operations the shunt was placed between the left atrium and the femoral artery and was driven by a roller pump with manometric control of the inflow and outflow tubes, as well as of the systemic blood-pressure. It functioned perfectly for 33, 45, and 55 minutes in the three patients who survived. None showed any neurological or renal disturbance.

It is a real advantage to retain the normal body temperature in such patients: in hypothermia the risk of ventricular fibrillation is ever-present, and it seems to be aggravated by high aortic clamping with its sudden strain on the left ventricle. We may expect to hear more of this by-passing of the aorta while dissection and reconstruction proceeds in the unhurried way which is such an important factor in ultimate success.

THE BURNING-FEET SYNDROME

THE burning-feet syndrome was observed in Japanese prison camps during the 1939–45 war.[10] Malnourished prisoners had severe burning and aching in the feet, lower legs, and sometimes hands, without any convincing neurological signs. The condition improved with administration of yeast and certain other substances containing vitamins of the B complex. Gopalan [11] described the same symptoms in Indians, and reported rapid improvement with calcium pantothenate.

A somewhat similar disorder is occasionally found in the old. There are severe burning and aching in the feet, and less often hands, with no neurological abnormality and no apparent cause. The symptom is worse when the feet are warm, and may therefore disturb sleep severely. The burning pain in the hands which is so common a feature of "housewives' neuritis" is also mainly nocturnal and aggravated by warmth, but its ætiology is probably different.

The burning-feet syndrome of civilian practice responds poorly both to pantothenic acid and to whole vitamin-B complex. Bibile and his colleagues [12] provide further unequivocal evidence on this point. In a simple but well-prepared and well-presented clinical trial they treated three groups of patients. All had burning of the feet or other extremities as a prominent symptom, and none had any gross neurological, cardiovascular, or metabolic disorder. One group were given 500 mg. of pantothenol (the alcohol derivative of pantothenic acid) twice weekly by intramuscular injection; another group was given the same dose of pantothenol orally; and the third group served as a control. Pantothenol had no significant effect on the symptoms.

This well-conducted trial seems to absolve clinicians from the necessity of giving pantothenic acid in the search for a cure of this often distressing symptom. A similar trial of whole vitamin-B complex is promised. Judged by the sporadic results of clinical practice in this country the findings of this second trial may also be negative. It is not unlikely, of course, that the syndrome seen here has a different ætiology from that seen in the tropics and in a setting of malnutrition; but there may nevertheless be some common biochemical pathway.

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CONSPECTUS OF ULCERATIVE COLITIS

ULCERATIVE colitis has been in the news since 1944, when the introduction of an adherent ileostomy bag gave an impetus to surgery, which in turn led to closer understanding of the pathology. Intestinal obstruction is now recognised as the commonest complication following the institution of an ileostomy; it is usually due to fixation of the normally mobile small intestine by the stoma itself or adhesions leading to angulation and kinking; and the condition is prone to recur. Garlock and Kirschner [1] ensure that the terminal two feet of ileum is fixed by plication in the position of their choice, hoping thus to avoid acute angulation. Rogers [2] has reported two further cases of obstruction by obturation at the relatively indistensible stoma—or more exactly at the abdominal wall, since the exteriorised portion may become distended if the mucosa has been everted. Impaction was brought about by a plum-stone in one case, and by a gall-stone in the other. But patients with these stomas must be careful even with a normal diet: plum-skins, like plum-stones, may lead to obstruction.[3] Electrolyte losses from the stoma have been investigated by Crawford and Brooke,[4] who emphasise the sodium loss due partly to the voluminous postoperative output and partly to an increased concentration in the immediate postoperative period—though their figure of 300 mEq. per litre is difficult to understand since it implies that the sodium level within the intestinal lumen is well above that in the plasma. However, this figure has yet to be confirmed.[5] From the Mayo Clinic [6] comes a report on pregnancy after ileostomy, from which Bargen et al. conclude, albeit grudgingly, that it is safe for an ileostomy patient to undergo pregnancy provided that all the large bowel has been resected; for recurrence of colitis in a retained portion is, in their experience, the sole complication likely to alter the course of pregnancy.

Thus the lot of the ileostomy patient is now much happier than of yore; but it is still not without difficulties and even dangers. Dukes and Lockhart-Mummery [7] describe how these patients have taken some of the responsibility into their own hands by forming themselves into an association to aid new patients, to advise on problems of employment and reablement, and to promote research. Perhaps the association's most valuable work is done through its visiting service, whereby hospital staff may call upon members to visit patients about to undergo operation; for nothing brings home more forcibly that an ileostomy need not cause disability than seeing someone with a well-established stoma and discussing problems and fears with him.

Work on the ætiology of the disease has unhappily not advanced much.[8] But in therapy conservative management has received a stimulus from the ubiquitous steroids.

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8. Warren, I. A., Berk, J. E. *Gastroenterology*, 1957, **33**, 395.

Kirsner et al.[9] report that of 180 patients who received corticotrophin 85% showed immediate benefit; but 70% relapsed and the results of renewed steroid therapy were less striking. From the circumstances revealed in the account of some of the cases it seems that not all the 180 patients had ulcerative colitis in the strictest sense; some may have had Crohn's disease, a condition more amenable than ulcerative colitis to steroid therapy. Sleisenger et al.,[10] who recommend corticotrophin in the fulminating disease, note that this may induce perforation; and Brooke [11] has shown that rapid "disintegration" may beset the colonic wall after administration of corticosteroids. Though 3 of the 12 deaths in the series of 180 reported by Kirsner et al. may have been due to perforation, Kirsner's group [12] have lately expressed the belief that in chronic ulcerative colitis corticotrophin does not increase this hazard. But patients with chronic ulcerative colitis, though they may not be especially subject to this hazard, seem unlikely to benefit from corticotrophin; for Elliott and Carborne [13] have found, in a study of 30 patients, that steroids brought about remission in no case of more than two years' duration. Otherwise there has been a description of a radiographic appearance (the indenture sign [11]) in colitis of any type, but particularly in ulcerative colitis. This appearance seems to be identical with that previously described by Brooke [11] as pseudohaustration. Finally Dennis [15] has reassessed vagal section undertaken in 30 patients eight to ten years ago. Less than half had even symptomatic relief. Of the 7 subsequent deaths 2 might have been prevented, as might carcinoma in another patient, yet alive, had excision, not vagotomy, been the choice.

IDIOPATHIC PULMONARY HÆMOSIDEROSIS

IDIOPATHIC pulmonary hæmosiderosis has been recognised as a clinical entity only quite lately. The basic anatomical lesion—deposition of iron-containing pigments in the lungs—was described by Virchow, but clinical reports did not appear until 1940.[16] In 1948 Wyllie et al.[17] were able to trace only 17 published cases, but Soergel [18] recently reviewed 65.

The disease affects predominantly children mostly but is also seen in young adults. The age of onset is commonly 1–2 years, but a second peak occurs between 13 and 15 years.[18] The characteristic symptoms are acute recurrent, and often increasingly severe, attacks of cyanosis, dyspnœa, cough, and hæmoptysis; other symptoms include vomiting, abdominal pain, fever, and tachycardia. Attacks may last several days, and pallor and jaundice are usually evident before the acute episode ends. The clinical signs indicate acute congestive cardiac failure, with tachycardia, distended jugular veins, a dilated right heart, congestion of the liver and spleen, and scattered moist sounds in the lungs.[17] Macrophages containing hæmosiderin can be demonstrated in the sputum or gastric washings; children who swallow their sputum have occult blood in the stools. Between attacks the child looks pale and weakly, fails to thrive, and suffers from frequent "upper-respiratory infections". Clubbing of the fingers and generalised lymphadenopathy have also been noted. Hodson et al.[19] describe two forms of radiographic change: firstly, bilateral blotchy widely scattered shadows, up to 3 cm. in diameter, which are characteristically transient, and, secondly, slowly developing mid-zone and lower-zone miliary reticulation. Comparison of the films of thin slices of lung with sections stained for blood and hæmosiderin showed the acute shadowing to be due to multiple small hæmorrhages, while reticulation was related to hæmosiderin deposits.

Treatment is unsatisfactory and the average life expectancy is only three years from the onset. Temporary spontaneous remissions are not uncommon, and must be taken into account in assessing therapy. Improvement has been noted after splenectomy and after courses of steroids, and Browning and Houghton [20] report complete clinical remission for six years in an adult treated with corticotrophin.

The ætiology is unknown. Recurrent intra-alveolar hæmorrhage is followed by fibrosis. The elastic fibres in the alveolar septa and small pulmonary blood-vessels are hypoplastic,[17] but it is far from certain that this constitutes the primary lesion. The condition resembles the hæmosiderosis in mitral stenosis and cardiac failure, but the myocardial changes which are sometimes seen are insufficient to account for the pulmonary lesions. The development of fibrosis depends on more than the presence of iron in the lungs, since it does not follow the inhalation of iron dust in industry.[21] In hæmochromatosis the pulmonary lesions are inconspicuous in the presence of extensive fibrosis of the skin and other organs. Similarly, in 16 cases of post-transfusional hæmosiderosis Kleckner et al.[22] found that none showed significant iron deposits in the lungs. It appears that intra-alveolar hæmorrhage is an essential prerequisite for the development of pulmonary hæmosiderosis.

No disorder of the blood-clotting mechanism has been demonstrated in idiopathic pulmonary hæmosiderosis. Reticulocytosis, a raised serum-unconjugated-bilirubin level, and increased urinary urobilinogen may simulate a hæmolytic process, but these findings are equally compatible with the destruction of extravasated blood. The anæmia of idiopathic pulmonary hæmosiderosis is in fact of the iron-deficiency type, with hypochromia, microcytosis, low mean corpuscular hæmoglobin concentration, decreased serum-iron, and a favourable response to iron therapy. This starvation in the midst of plenty appears to be due to inability to utilise the vast stores of iron contained in the lung parenchyma. Using radioactive tracers of iron (^{59}Fe) and chromate (^{51}Cr), Apt et al.[23] followed the red-cell survival and metabolic pathway of iron in 2 patients with idiopathic pulmonary hæmosiderosis. Normal results were obtained during remission of the disease, but 1 of the patients studied during an acute attack showed an excessive plasma-iron turnover accompanied by high counting-rates over the lung fields which persisted for four months. The red-cell survival was normal, and no excess of radio-iron could be demonstrated in the spleen. These findings confirm the clinical and pathological evidence of intra-alveolar hæmorrhage, the cause of which remains a mystery.

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Public Health

THE SURVEY OF SICKNESS, 1943-52

Was Our Survey Really Necessary?

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England has been singularly fortunate in her medical statisticians. The official story started on July 10, 1839, when, by a piece of pure jobbery, Dr. William Farr, L.S.A., was appointed compiler of abstracts in the new General Register Office at £350 a year. Had the post been formally advertised, this patient-less general practitioner might not have been appointed, Farr's Law might not have been enunciated, and we might never have gained what Major Greenwood has described as "the best vital-statistical system in the world".

In our own times, the Farr tradition has been finely carried on, under successive Registrars General, first by Dr. Percy Stocks, and now by Dr. W. P. D. Logan and his staff. But, though the tradition is the same, the tools are sometimes different. Among these new tools, an important place is occupied by the social survey and the technique of sampling. The story of what is almost certainly the most extensive health survey ever made is now told in the twelfth of the General Register Office studies on medical and population subjects—*The Survey of Sickness, 1943 to 1952*, by W. P. D. Logan and Eileen M. Brooke.[1] It is a story with more than a touch of adventure, with a romantic birth, a surprising confirmation, and a dramatic death. I know, for by good fortune I was there on each occasion in a godfatherly capacity.

The essence of the modern social survey is the technique employed at the point of collection of the data. A census may be made to yield facts of social importance; but the quality and control of the enumerators is inevitably variable. In a social survey, the investigator or his trained agents gather the field data under far stricter conditions. The first social survey in this sense was made by Dr. John Haygarth in Chester.

It was published in 1784, under the title of "An inquiry how to prevent the smallpox, and proceedings of a society for promoting general inoculation at stated periods". A careful field study of 20 smallpox cases showed that infection could invariably be traced to contact with another sufferer, and that provided simple rules of isolation were observed, there need be no further spread. Those observing the rules of isolation were each paid 10*s.* reward; and the special thanks of the society are recorded to Mr. Smith, watchmaker, and Mr. Jenkins, tanner, who observed the rules but declined the money. The result of the survey was the establishment at the Chester Royal Infirmary of the first hospital isolation wards in the world.

The subsequent history of the social survey is unfolded by Dr. Logan and Miss Brooke.

To Edwin Chadwick, as secretary of the Poor Law Commissioners, goes the credit for the initiation of large-scale on-the-spot interviewing, as the basis for his report of 1842 on the sanitary condition of the labouring population. It was not until the end of the 19th century that Booth in London and Rowntree in York once more applied social survey techniques to the study of poverty and health.

The year 1912 was a landmark in social survey history, for it was then that Bowley, in a study of poverty in five provincial towns, introduced the technique of sampling. Instead of attacking every household, he interviewed only about one in twenty, selecting them at equal intervals from a complete list. This method resulted in a striking reduction in cost, with only a minimal and ascertainable reduction in accuracy. Thereafter, a spate of social surveys followed, among which were a number specifically directed towards health.

START OF THE SURVEY OF SICKNESS

In 1941, I found myself at the Ministry of Information, looking after the Home Intelligence Division and the War-time Social Survey. The Home Intelligence Division was a qualitative probe, designed to find out public opinion on the war and its effects among the civilian population. The War-time Social Survey was a precise statistical machine, for carrying out sample surveys at the request of any Government department. With a large team of interviewers, coders, sorters and statistical analysts, it could provide social and economic data about the habits and behaviour of the public as a preliminary to Government action. Speed was no less essential than accuracy, for Home Front decisions had to march in step with military necessity. So an intervewing team was built up large enough to sample the entire civilian population in a fortnight.

The birthpangs of the War-time Social Survey were violent. It survived the "Cooper's Snoopers" Press campaign and then a searching examination by the Select Committee on National Expenditure. Once it was safely established, the main difficulty was to maintain the organisation at concert pitch. The field organisation could complete a survey in two or three weeks. So the economic requirement was 12 to 15 major surveys a year. The Civil Service had to learn to use the new tool placed at its disposal. The task of keeping the survey going would have been far more difficult had not there been among the temporary war-time Civil Servants a sprinkling of university sociologists familiar with survey techniques and of advertising agents accustomed to market research. Perhaps one in four of the surveys made was literally vital to the war effort; as such, it was worth many times its cost. To get the one vital survey, three less essential but nevertheless useful surveys were needed to keep the wheels turning. In miniature, the position was that of an army which must always be ready to fight, yet able to spend only a quarter of its time in vital combat. So we had to become commercial travellers in social surveys, persuading colleagues in different Departments that accurate social diagnosis was an essential preliminary to successful treatment.

It was a happy paradox of the second world war that the gloomy expectations about health were not fulfilled. As Dr. Logan and Miss Brooke remind us, food rationing, long hours of work, the blackout, and general stress and anxiety were expected to have serious effects on health. Yet 1942 broke all previous low records for maternal and infant mortality, stillbirths, and the standardised death-rate. The incidence of infectious disease was also remarkably low. Yet there were coming in many complaints of people feeling tired out, "below par," and "not up to scratch". Moreover, the reduced number of general practitioners claimed that their work had never been heavier. Here, then, was a genuine gap in the national health picture. The War-time Social Survey could provide a regular overall picture of the national morbidity, and conversely of the national health, obtainable at that time in no other way. Moreover, such a survey would provide the machine with the regular work it needed to keep it at concert pitch. Our offer to measure medical consultation-rates was quickly accepted by the Ministry of Health, and the War-time Social Survey went into action as an agent for the General Register Office to provide the raw material for a national index of morbidity.

The value to medicine of the Survey of Sickness can be judged from the report under review, and from the

1. H.M. Stationery Office, February, 1958. Pp. 80 4*s.*

more detailed and specialised reports already published and listed in Dr. Logan's bibliography. The value of the Survey of Sickness to the Social Survey itself (it dropped the "War-time" from its title in 1945) deserves to be recorded.

Since the war, the contribution of the Social Survey to national efficiency and the national economy in many fields has been enormous. The peace-time Civil Service has used it wisely and well. Yet without the Survey of Sickness as an important raison-d'être, the social survey might not have survived the stormy transition from war to peace.

These were difficult days for politicians and Civil Servants alike. Not only had a party Government, pledged to extensive social reform, to replace a Coalition; but also the war-time administrative machinery had to be reshaped or abandoned, and few knew just what was worth saving. I was by then a new and green Member of Parliament. Word reached me that the future of the survey was in the balance. One powerful Minister was thought to favour its abolition. So I sought him out. To explain the value of sampling techniques in a semi-planned economy seemed a hopeless proposition. So I told him that the survey was a continuation of the work of the Webbs, that it was in danger, and that only he could save it. He agreed to talk it over with his officers and see what could be done. He was as good as his word, and the survey in due course became a permanent part of the machinery of Government.

TECHNIQUES AND COSTS

In its final form, the Survey of Sickness involved the monthly interview of a sample of 4000 people on the subject of their sickness experience during the preceding two months. To cut down interviewer travel, a method of stratified sampling was used. A specimen interview form or "recording schedule" is given in the report. It is a beautifully clear document, designed to enable the interviewer to record with precision what might easily degenerate into a rambling account of past health experience. Definitions adopted were equally precise, so that serious, moderate, mild, and minor illness have each a clear and continuing meaning.

The appraisal of techniques in the report is full and fair and the conclusion that the memory factor was not a source of serious error seems to be justified. The only criticism which can be made is the elaborate analysis of diseases alleged to have been suffered by the informants. Yet even here, a sensible grouping of complaints into a number of categories commonly spoken of by the public has reduced what must have been a diagnostic jungle into a neat social plantation, which, even though its source was "what the patient said", nevertheless has considerable medical significance.

In one valuable table, diagnoses are related to average duration of incapacity and medical consultation-rates. From this source it is possible to learn that there was one medical consultation for every ten attacks of the common cold, but three medical consultations for every two attacks of influenza.

Some of the more striking causes of incapacity to work productively or domestically were:

—	Average duration of incapacity in days per month per 100 people of 16 and over	
	Males	Females
Influenza	10·76	11·75
Bronchitis	9·56	9·15
Common cold	3·66	5·68
Cardiovascular disease	2·40	2·62
Rheumatism, arthritis, and sciatica	7·31	8·33

These figures do not, however, include persons permanently incapacitated.[2]

2. Varicose veins are not here counted as cardiovascular disease.

In all, between 1943 and 1952, nearly 300,000 people were interviewed. At a guess, the cost of this investigation may have been about £30,000 a year. It is virtually impossible to cost the conventional statistics of the national health, but it must be many times greater than £2500 a month. There can be little doubt that the expenditure on the Survey of Sickness was fully justified. The results are a quarry from which many have dug in the past, and many more will dig in the future, with great profit to the public health.

SOME RESULTS

In precision, medical reporting has clearly many advantages over the direct survey of the public. But it can never show the amount of morbidity and incapacity which does not reach the doctor's attention. Out of 100 persons complaining of some sickness during an average month, 77 did not visit their doctor. Though much of this sickness was probably trivial, the ascertainment of its extent and existence was possible in no other way.

By good fortune, the Sickness Survey covered the period of introduction of the National Health Service. Discounting the effects of the weather and influenza epidemics, comparing 1946–47 and 1949–50, there was virtually no increase in consultations for men under 65. For women and for old people, however, there was a real increase, leading to a total extra volume of work for the doctors of about 10%.

The mean monthly sickness-rates over a six-year period show remarkably steady seasonal pictures. In all age-groups over 16, females have higher rates than males; thus the figures for females aged 16–44 correspond closely to those for males aged 44–65.

Among men, injuries cause between two and three times as much incapacity as among women, the average incapacity per injury being between four and five days. A great part of this must be industrial injury of a comparatively trivial nature. Skin diseases cause up to a fifteenth of all medical consultations though in those aged 65 and over, they form only a small part of the total illness recorded.

The mean annual dental consultation-rate per 100 persons of 16 and over in 1950 was 51 for men and 59 for women. Women had a higher rate than men in each occupation and income group. Younger people see the dentist far more often than old people:

—	Mean annual dental consultation-rate per 100 persons interviewed	
Age or occupation	Men	Women
16–44	63	81
45–64	36	41
65 and over	22	18
Professional and managerial	70	95
Agricultural	27	44

Perhaps the most illuminating figures of all are those for rates of medical consultations analysed by region.

—	Monthly consultation-rates per 100 people interviewed			
	Males		Females	
Age	16–44	45–64	16–44	45–64
Newcastle region	40	63	45	68
Manchester region	30	55	51	69
Wales	43	61	54	74
London	35	48	41	50
Cambridge region	20	43	34	43
Reading region	23	21	28	38

Such figures show the great difference in the number of consultations per patient at risk between the cold and damp industrial North and West, and the South and East.

They may help to explain the queues for general-practice vacancies in the South as compared with the paucity of candidates in the North.

CONCLUSION

The Survey of Sickness came to an abrupt end in February, 1952. Plans had been made, with the cooperation of a number of general practitioners, to check patients' statements at interview against doctors' records; but, before this could be done, the survey was stopped. The decision was taken at a high political level. Once more, I talked it over with the Minister concerned. But although he was satisfied that the Social Survey should continue as a piece of Government machinery, he declined to continue with the Survey of Sickness.

It must be at once said that his reasons were cogent. Other sources of national morbidity statistics were developing. The coming of the National Health Service had made possible a national hospital inpatient inquiry; the Ministry of National Insurance analysis of sickness claims gave a new and useful picture. And Dr. Logan and his colleagues have initiated sample inquiries of general practitioners' records. Here we have in embryo medical intelligence service with greater potentialities than the Survey of Sickness.

As Dr. Logan and Miss Brooke remark:

"these, in their various ways, provide in greater detail and with greater accuracy, much of the information that could be provided by a Survey of Sickness, both as regards the volume and distribution of medically treated illness, and about its trend in time. There seems at present, while the statistical potentialities of these other methods are still being developed, no essential role to be played by a Survey of Sickness of the 1944–51 model, concerned as it was with the broad patterns of sickness in the adult population as a whole."

With this conclusion one must concur. The Survey of Sickness was a good job, well done, of value in itself and of value in establishing the Social Survey. As long as the Social Survey and the Registrar General's office remain in being, they can come together again for ad-hoc or continuing inquiries, should the need once more arise.

Infectious Diseases in England and Wales

Disease	Week ended February			
	1	8	15	22*
Diphtheria	2	3	3	6
Dysentery	964	1060	1327	1545
Encephalitis:				
Infective	3	3	5	..
Post-infectious	2	..	..	2
Food-poisoning	145	163	158	188
Measles, excluding rubella	3473	3752	4533	4618
Meningococcal infection	26	37	42	35
Ophthalmia neonatorum	27	26	32	26
Paratyphoid fever	4	2	2	..
Pneumonia, primary or influenzal	909	1023	884	793
Poliomyelitis:				
Paralytic	4	16	13	15
Non-paralytic	7	4	5	10
Puerperal pyrexia	239	243	264	224
Scarlet fever	880	873	889	853
Smallpox	..	..	..	..
Tuberculosis:				
Respiratory	619	599	578	537
Meninges and C.N.S.	7	9	11	8
Other	56	59	71	50
Typhoid fever	2	2	4	2
Whooping-cough	645	721	580	645

* Not including late returns.

The Widdicombe File

XLIV. "TOGETHERNESS"

DEAR ALVIN,

Many thanks for the reprint of your article on hypertension. I had already read it in the *P.A.J.A.M.A.* with admiration, even though I can't agree with some of your views on management. At least, I presume that they *were* your views; you chaps collaborate nowadays in such droves—I see you were fourth in the batting order—that it is hard to know who is responsible for which opinions. And don't tell me that even in the States six physicians can be found who all agree completely on the treatment of such a complex disorder as hypertension, because I just don't believe it! But possibly some of your collaborators just came along for the ride, so to speak?

However, over here as well, the fashion is all for "teamwork" these days. You can't attend a lecture or meeting anywhere without hearing someone hold forth on the virtues of teamwork and cooperation and liaison (when I was a boy "liaison" meant something quite different, but let that pass), and it all sounds very progressive and cosy. I suppose it is inevitable and in many ways desirable, though it does make the occasional oldfashioned individualist like myself feel a bit irritated at times. Desirable, that is, so long as the team is an association of medical men; but I seem to detect a growing tendency to want to bring the patient into it, and I think this can be dangerous.

Which brings me back to your paper and to that part of it with which I disagree most strongly. You advocate the practice of getting patients on hypotensive therapy to measure their own blood-pressures at home, and I gather that this is often done in the States. I don't think it is popular in this country—yet. "Physician–patient teamwork" you call it. Well now, it is obvious that in some fields of medicine like psychotherapy the patient's full cooperation is essential, and I agree that in diseases like diabetes you can't get really good results unless he is reasonably intelligent and helpful. On the other hand, sometimes the patient has to play a purely passive role, either because he is mad or because his disease is too complex and difficult for him to understand. But where I think we have to be careful with this patient cooperation business is in the diseases which have strong emotional overtones, and of these essential hypertension is an outstanding example. Tell the average patient that he has chronic nephritis or parkinsonism and he won't bat an eyelid; but tell him that he has poliomyelitis or high blood-pressure and you are liable to scare him stiff. Nobody fears uræmia, but everyone knows about strokes and heart-attacks. It seems to me that when you invite patients to cooperate in the treatment of their hypertension by recording their blood-pressure, you are asking them to adopt an impossibly objective attitude towards their disease, and then you run a big risk of aggravating the anxiety about it which nearly all of them already feel.

You may reply that it is all a matter of educating the public, and that I am just an insular old obscurantist, seeking to perpetuate an obsolete apartheid relationship between doctor and patient, in which the former dispenses esoteric magic which the latter must accept without question. I will admit that conditions are not quite the same in our two countries. Your patients seem to expect and even demand to know a good deal more about their condition than do ours. I have often wondered whether

this is because British patients are intellectually lazier, or because they are not so sold on the wonders of modern therapeutics (though the B.B.C. is doing its best in this direction even as I write). There is, you know, something to be said for not inquiring too much about what is going on, in case one should begin to have doubts as to whether it is likely to be successful. However, to return to the point; there must surely always be a limit to the power of even the most intelligent and educated patient to understand his own complaint and therefore to his ability to cooperate, in the fullest sense of the word, in its treatment. Moreover he can never view it dispassionately, as we do, because he is, to use current literary jargon, too much "engaged".

This isn't all jam for us. Haven't we all at some time or another, when faced with a case whose management is proving difficult, been tempted to discuss our difficulties with the patient, and thus unload some of our doubts and anxieties on to him? And haven't we always bitterly regretted yielding even a little to such a temptation?

You are probably by now protesting that I am making very heavy weather of your comparatively innocuous suggestion that some patients be allowed to take their own blood-pressure. Possibly I am, and perhaps I am wrong in seeing in this suggestion a straw in the wind, a step towards the "Do-it-yourself" Medical Kit, a move to shift on to the patient responsibility which is not rightly his to bear. But patients put themselves in our hands, and it is *our* job to treat them, and *our* responsibility if we fail. Suppose one of your patients muddles his measurements and things go wrong; don't you think you might be tempted—just a bit—to blame the result on him?

Sorry, Alvin, but I mistrust your "physician-patient team" notion. It sounds fine, and in some circumstances may work very well. But when dealing with disorders which are potentially fatal and for which we have not yet got a certain cure, it may, I believe, be harmful. If you start taking patients into partnership, as it were, you will find that you are inevitably drawn more and more into discussing with them the pros and cons of what you are doing, and the chances are that you will finish up with a lot of very worried people.

Tell me one thing. Logically your ideal "physician-patient team" should be one in which the patient is himself a physician and can thus cooperate, team-up, or whatever with full understanding and insight. Does therefore your heart leap with joy when you are asked to treat an anginal colleague? Well, all I can say is that mine doesn't. I'll settle for the patient who says "I leave it to you, Doctor", and who don't ask no questions and so don't have to be told no lies.

I shall expect an I.C.B.M. by return of post. Meanwhile, love to Susie and Alvin junior. Young Rodney says can you possibly send him a real satellite for his birthday? One of the very small ones would do. The poor child suffers from a fixed delusion that doctors have something to do with Science!

Yours transatlantically,

RODNEY PEARSE.

Special Articles

PSYCHIATRY IN GENERAL PRACTICE *

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IT has been the tradition in hospital for disease to be considered either organic and worth investigating or functional and not worth investigating. Functional disorder has therefore seldom been properly evaluated, and practitioners who "reassure" their patients that there is nothing wrong with them except their nerves remain unconscious of the fact that they are reassuring only *themselves* that there is no underlying organic disease.

Functional disorders cannot be investigated by the methods applicable to organic disease. The doctor who chooses to investigate functional disorder needs to keep a quiet, patient, and receptive mind during the interview with his patient, and must find time for the work outside his busy surgery hours. Clearly investigation by question and answer, or by X-ray or other precision instrument, will tell the doctor nothing about the patient's mental problem. The unconscious does not present itself dressed up in the language the student is taught to use at hospital when investigating organic disease. It has a special language of its own which has to be learnt. Unfortunately, though the words are the same, the way they are spoken and used is different. The doctor can therefore investigate functional disease only by learning this language and listening to what the patient has to say or to what he is trying to say.

What is the language of functional disorder? Let us consider the words of a patient.

"I want an X-ray," he says. It is natural for the doctor to assume that the patient is using the word "X-ray" in the same sense that he uses it himself. So when the patient goes on to say that he has been living with his brother who has been found to have active tuberculosis, the doctor considers the patient's request a reasonable one and arranges for him to be radiographed.

But there is another type of patient who asks for an X-ray of his chest. He comes into the surgery rather nervously and says, perhaps, that he has a vague tightness on the left side of his chest and that he is afraid he might have cancer. The doctor immediately senses something "functional" about this. He takes a careful history and examines the patient thoroughly. "My dear chap," he says, "I can't find any sign of cancer. Your heart and lungs are quite healthy. There's no need for an X-ray. In fact, no need to worry at all." "But I would like an X-ray, doctor," the patient persists. And the doctor, looking at his notes, says: "But I see my partner sent you for an X-ray only three months ago and nothing was found wrong then." "I know," the patient continues pathetically, and at the same time rather obstinately, "but I should like one all the same—to make quite sure." And it is at this point that the wretched doctor usually gives in, either because he now can't feel quite sure himself or because he wants to get on with his surgery.

But why doesn't the doctor listen to the patient? In the first case he listened carefully and carried out the patient's reasonable request. In the second he knew the patient's demands were unreasonable, but as soon as he became aware of their large functional element he lost interest, and was no longer able to observe or listen to the patient carefully. He started to impose his own personality between himself and the patient. He let his mind wander on the subject of neurotics in general and the man's obstinacy in particular, and naturally became unaware of what the patient was trying to say.

The patient was clearly under some stress, which was oppressing him. He felt uneasy and tight about the chest. He must seek some relief from this sense of oppression. He would

* From a paper read in a symposium on this subject held at University College Hospital, London, on Oct. 18, 1957.

go to his doctor. But his doctor would laugh at him if he just said he had a tight feeling in his chest. Of course, it had come on only after his wife had died, but he didn't suppose that would have anything to do with it. He had never felt ill before. If only his doctor could find out what was the matter with him. See through his trouble. That's it! I'll get him to X-ray me. Good heavens! There was that awful article about cancer of the lungs and smoking. Yes, I must see the doctor and get an X-ray. I may have got cancer. . . .

The doctor should change his technique of investigation in a case like this, as soon as he senses the functional element. He should stop asking questions and let the patient tell his story in his own way. And if the patient can then feel that the doctor is sympathetic to what is going on in his turbulent mind and is making no attempt to pass a moral judgment, he will tell the doctor far more about his real problems—more about his unhappy domestic situation than about the tightness in his chest. But at the end of the first interview he may well return to the attempt to blame his symptoms on some organic disease.

In general practice at least 40% of patients have symptoms of functional disorder, and as most of them are investigated for and treated with remedies for organic disease, it is not surprising to find them attending regularly year after year. Doctors cheerfully accept this anomalous situation till the anomaly is pointed out to them, and then they cannot understand how they ever came to accept it. Let me give a simple illustration of the change that has taken place in my practice since this anomaly was pointed out to me by Dr. Michael Balint in his general-practitioner group at the Tavistock Clinic.

A married woman, aged 24, rang me up one morning from her office saying that she had collapsed on her way to work with palpitations of her heart, that she felt better now she had rested; and would I see her? As she spoke, I came to the conclusion that she was not suffering from organic disease (such as the onset of auricular fibrillation) because of the words she used to describe her symptoms. And I must stress here that analysis of the language the patient uses gives the clue to his problem every time; or perhaps not so much analysis as automatic recognition of the words and phrases used. Five years ago I should have taken her history, and she would have said, as she did, that she felt faint while walking from the bus stop to her office and had felt a sort of flutter in the front of her chest, that she had been helped to the office and had recovered in a quarter of an hour after resting quietly in a chair. I should have thought to myself, as I examined her, of such possibilities as a minor epileptic fit, heart-disease, or early pregnancy. I should have found nothing physically wrong. I might have referred her to a cardiologist to exclude heart-disease, or to a radiologist to exclude early pulmonary tuberculosis. I should then have reassured her that there was nothing wrong, that young people like her occasionally felt upset like that, and that she should report again if she had any further attacks. In fact I did none of these things. From the opening conversation on the phone I sensed that the problem was an emotional one; and when I saw her I decided to listen carefully to what she had to say and direct any questions that had to be asked to finding out what was happening in her mind at the time of the incident.

" I got off a bus in Oxford Street yesterday morning, and while walking to the office felt a sudden flutter in front of my chest."

" Were you walking with anybody? "

" Oh, yes, with another girl from the office, and she said ' You look pale ', and then I realised my heart was thumping and I felt I was going to faint. But she helped me get to the office where I sat down in a chair till I felt better."

" But what were you talking about? "

" Talking about? Oh, I remember. It was about the Bank Holiday weekend."

" Yes, but what about it? " (You will notice the patient was putting up some resistance here. That meant I was getting warmer but was on dangerous ground, and if I pressed my inquiry too hard the patient would get frightened and say nothing of importance.)

" Well, she said she had to go a long way to visit her parents, and I said that fortunately mine lived fairly near and that I was going to visit them on the Sunday and my husband's parents on Monday, and then I felt the flutter."

She went on to say that she had been happily married for a year, that she had no particular worries, and that she got on as well with her husband's parents as she did with her own. But then she volunteered the remark that her in-laws ran a pub; and from the way she said the word " pub ", it was evident that either she did not like her in-laws as much as she pretended to herself she did, or she could not bear to be associated with anyone who ran a pub. It was not surprising, therefore, to find that in suppressing her natural dislikes and pretending all was happy she should convert her strong unconscious feelings about in-laws and pubs into a respectable cardiac palpitation. I interpreted this to her and it obviously struck home, for instead of saying " Is my heart all right? " she said " What shall I tell my husband? "

Now do let me be clear over this case. I did not cure the patient. I merely found an explanation for an apparently non-organic irregularity of the heart-beat. It would need many more talks with the patient to make her feel less upset by her in-laws' connection with a pub. What did a pub mean to this patient? Why not something quite respectable? And so on. But in this case I think the patient felt quite clearly the connection between her faint attack and her in-laws, and as a result would be unlikely to have a further attack. I say " felt clearly ", because it would not have been enough for her merely to have listened to my explanation of her problems; for to say to a patient " It's only your nerves " seldom convinces them of the truth of your remark or makes the slightest difference to the alleviation of their symptoms.

When we listen carefully to what the patient is trying to tell us we often discover, early on in the conversation, some significant fact which seems to explain everything; but the rational explanation the patient first puts forward to the sympathetic doctor is seldom the real explanation of his trouble. We must therefore be cautious in interpreting the patient's first significant remarks as denoting the cause of his disorder.

An intelligent, but nervous, young secretary consulted me about a sudden feeling of weakness in her legs, and told me she thought she might be getting " polio ". I examined her and said I could find nothing physically wrong. She said she was glad to be reassured as she thought she might have caught it from her cousin, when she had visited him in hospital and found his legs paralysed. She had been dreadfully worried about her cousin. I then explained to her that her anxiety and the weakness of her legs were a natural and direct result of the worry over her cousin, and thought that my reassurance would be sufficient to restore the strength to her legs. But two days later she asked me to visit her as she felt too weak to come round and see me. I called to see her and again had to reassure both her and myself that she was not developing " polio "; but I still had to continue my visits and it was only at the fourth visit that she blurted out that she could not understand why she had given in to this nervous illness since she had coped so adequately with a much more distressing problem three months previously, when her fiancé had broken off their engagement, leaving her alone and insecure.

It then became clear that this broken engagement was the significant factor in her breakdown, and that, though she had apparently shown no outward signs of distress at the time, she had eventually given way as a result of the undermining influence of her cousin's illness. It became clear that her fiancé's rejection of her had given her a sense of instability, of which she felt ashamed, and that when circumstances offered her the possibility of poliomyelitis being the cause of that instability she readily accepted it.

It is necessary for us to be more sensitive to the disturbances of the unconscious. It is not enough to replace a label of " fibrositis of the shoulder muscles " with one of " a psychomatic disease due to constant muscle

tension in a nervous person", when no underlying organic disease is present. We must go deeper. We must listen more carefully to the language the patient uses to describe his complaints and note the order in which those complaints are presented. We must note the choice of phrase and the use of colourful adjectives. We must note the moment of hesitation or silence, and the moment of laughter or tears. We must remember in a first interview that the words that really matter are often the last words the patient says as we are writing out the prescription or seeing him out of the door. These are the words, often spoken half jokingly, which express his real fears and which are said last only because he knows that if you laugh at him he can make a quick exit without appearing more foolish than he feels for having said anything at all. We have all heard the patient say, after a long examination that has proved nothing organically wrong, "Well, you don't think I am going to die, doctor, do you?" and we have said, "Of course not. I wish I were as healthy as you", when we ought to have said, "Let's start this interview all over again. What on earth are you really frightened about?" This is the moment when the patient is most ready to tell us his troubles, and the moment when we are least ready to listen to them.

We must take our time. We must never interpret to the patient too quickly what we think is the matter with him. We must establish our relationship with the patient, not by showing him how kind we can be, but by showing him that we know what is going on in his mind and that we are not making any attempt to pass a moral judgment on what we find. We must always let the patient work his problems out in his own way. If the patient asks for advice, we must forbear the temptation to give it. We shall get much better results if we throw the words back and say, "Well, what would you do?" or "What do you think about it?" We must remember that many of these patients have had a difficult background and are playing out a predestined pattern of behaviour—a pattern related to their failure to work through the facts and fantasies of their early relationships with their parents in the œdipal situation. We must also recognise that our own reaction to the patient can be interpreted as a symptom of their illness. For instance, if at the end of an interview with a mildly hysterical woman we feel we are in a complete fog and cannot get any clear picture of her problem, we can be sure that that is just the situation in which the patient finds herself—in a complete fog.

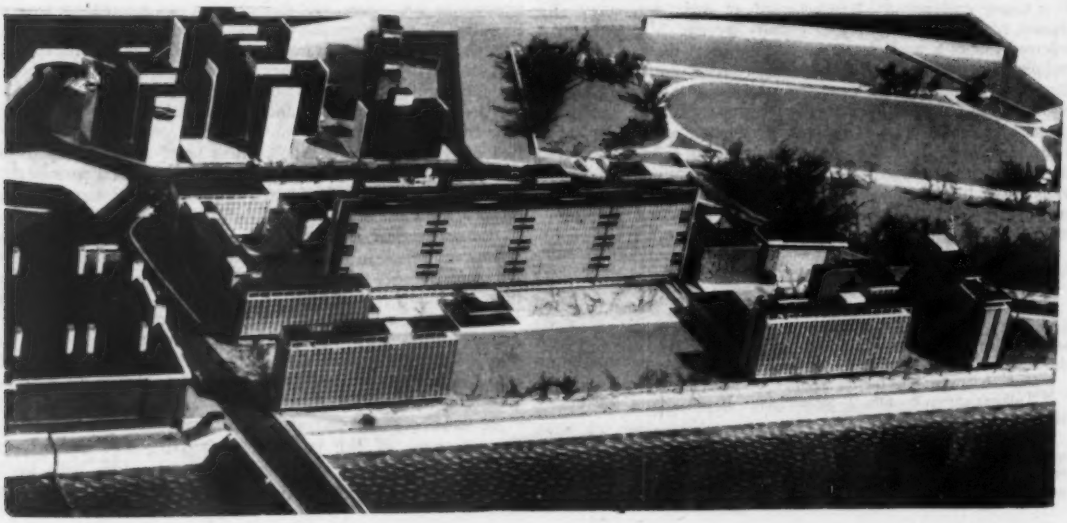
We can learn to unmask the disturbances of the unconscious mind that masquerade as organic disease only by studying the language of the unconscious, the language of symbols and silences, fears and fantasies, paradoxes and half-veiled truths. If we claim to treat all the patients who seek our advice, we must examine not only the organic parts of the body but also the fantasies of the mind. Only then can we come to a clear decision whether we can handle the patient's problem ourselves. Only then can we know where to refer the patient if his problem is beyond our skill.

REBUILDING ST. THOMAS'S HOSPITAL

THE Minister of Health has agreed that the governors of St. Thomas's Hospital, London, shall proceed with the initial stages of planning the new hospital on the lines we described in January.[1] An illustrated booklet[2] outlines seven schemes that have been proposed and rejected, and an eighth which has been adopted. This scheme entails the diversion of Lambeth Palace Road to run 400 feet further from the river. The accompanying figure shows what the proposed hospital would look like from the north-west. In the centre is the main eleven-storey ward block with laboratories; the outpatient and operating-theatre block lies behind it. Nearer to the river and to the left are gardens and residential blocks for staff; on the extreme right is the medical school. On the extreme left is County Hall; the buildings in the background, between the hospital and the railway, are not part of the hospital but are on a site owned by the governors.

The structure will be entirely new, except for three buildings (St. Thomas's House, Riddell House, and a post-war laboratory) near the medical school. The Royal Fine Arts Commission has approved the scheme in general, with some reservations about the medical school building but none about the hospital itself. The scheme will be submitted formally to the London County Council, the planning authority.

1. See *Lancet*, Jan. 11, p. 113.
2. Proposal for the rebuilding of St. Thomas's Hospital, 1957.



In England Now

A Running Commentary by Peripatetic Correspondents

WHO that saw it can forget (unfortunately) the recent feature starring Mr. Roderick (Butterfingers) MacGrolloch and his appendicectomy troupe. We easily recognised Mr. MacGrolloch because his theatre gown was inside out, and on the back were his name, address, telephone number, consulting-hours, and the nearest tube station. His personality came across vividly in his preamble. The shock was intensified when we learned the operation at which he intended, to quote his Doric colloquialism, "tae hae a baaash". In contrast with the mutilating operations which remove the appendix "in toto parrrrentis", said Mr. MacGrolloch, his multi-stage appendicectomy for surtax payers is the teeniest possible pruning of the annual growth of the organ. As he put it "You trim your hair, nails, and front lawn. Why not your appendix?"

The camera then took us into the theatre. There was brilliant symbolism in the opening panning shot, whose vertiginous nystagmus resulted from the theatre orderly's efforts to get the camera trolley off his foot; and for the next twenty minutes the viewers were gripped by the drama of a life-and-death struggle in the operating-theatre. Then the anæsthetist remembered to turn on the gas and the operation started. Mr. MacGrolloch used his sensational "treble chance" approach, which necessitates three incisions, one for each of his team. They can thus remove simultaneously three organs, one of which may well be the one they want.

The last thing your correspondent remembers was the supine patient and Mr. MacGrolloch hefting his scalpel like something out of *Moby Dick*; but viewers who retained consciousness will be glad to hear that the technician who fell from the camera-boom through the theatre skylight rapidly recovered when removed from hospital.

Credit should be given for the imaginative close-ups showing the anæsthetist's hands relentlessly suppressing the patient, pouring the tea, and catching up on his mail—though I still think he should have put Arsenal down for a draw. Then on to the other camera to watch screen-stealer MacGrolloch do a breathtakingly difficult dissection of two indispensable pages of *Surgical Handicrafts*, which had got stuck together with brown ale.

Altogether a memorable evening, and sucks to the old fuddy-duddies in Tavistock Square who don't want us to know when we're developing appendicitis.

* * *

On Feb. 25 a man was admitted to our wards with a head injury. He had been watching the heart operation on television. When the heart was opened he fainted and hit his head on the floor. Now we are awaiting a patient with a heart attack resulting from watching the forthcoming head operation to complete our studies of this fascinating new field of traumatology.

* * *

"I know just the thing", he had said. His face had lit up with the pleasure of being able to help. I had poured out all my symptoms as rapidly as I could—lack of sleep, loss of appetite, constipation, palpitation, giddiness, blackouts, and many more—and he had examined me first from one side of the bed and then the other. Perplexed and flustered he had stood back, and I had mentioned THE PAIN. There was no doubt my story was odd and my signs, if any, were no doubt odder; but here was something to be grappled with and laid low. I had a pain, not perhaps a severe pain or even a moderate pain, but certainly a pain. "I know just the thing", he had said, and he had written out the prescription with a gleam of satisfaction in his eye, although there was still an anxious look on his face and a certain reluctant resignation as he left me and my symptoms to myself.

Now he faced me again. "Did they suit you?" he asked. I lay there, miserable and wretched patient that I was. What should I say? His prescription lay untouched, in the top drawer. He had a worried expression. His eyes were looking at me full of doubt, full of apprehension. In anguish he gazed at me. In anguish I gazed back. "Did they suit you?" he asked. I screwed up my courage. I knew his symptoms. I must treat him, but my own symptoms lay like a pall over me, impeding me. The corner of his mouth quivered, and I knew that I must act quickly. "They were wonderful", I breathed. His face relaxed and it was as if day had dawned after the night, as if peace had come after war. He squared his shoulders. His face relaxed and became assured. He felt my pulse. I closed my eyes and dropped into a deep calm sleep. I went back to work next day and he hasn't needed to see me any more.

* * *

The fact that there's a hedgehog at the bottom of our garden does not seem inherently remarkable, until you realise that our garden is in London, N.7, with close on two miles between us and the nearest major open space. I first spotted him (or her) late one evening in September, in the gutter outside our front door. By the time I had collected the family and a coal-shovel, he had gone. But ten days later he was there again. This time I collected the shovel only, and just managed to beat him to it. I popped him down on the garden path, shut the gate, and only then called the scrutiny committee. By this time he was already halfway across our garden. It is always a surprise to see a hedgehog run, and I have yet to see one climb, a feat they are said to perform when in search of apples. Anyway, that was the last of our hedgehog, for he was seen no more.

Last Sunday I was digging out compost when I noticed something strange in the wheelbarrow. It was a touch of spring, a fresh grey-green, quite unlike its very dead surroundings. It was the hedgehog right enough, in, I presume, hypothermic coma, unless my shovel had done him some mortal injury. Mindful of the story that the hedgehog is fuller of fleas than a fowlhouse, I did not carry out a full physical examination, but quickly made him a new bedroom on the safe side of the compost heap. I hope I buried him deep enough, for two days later he was under eighteen inches of drifted snow.

* * *

Recently an anæsthetist friend sat one of the higher examinations in anæsthetics. He was questioned among other things on the breakdown of hæmoglobin in the tissues, the tissue reactions in acute and chronic inflammation, atrophy and necrosis, the biochemical processes involved in the absorption of iron, the reactions of the body to septicæmia, and antibiotics. It seems to me that had my friend passed this examination he could reasonably have been described as a competent pathologist and biochemist practising in anæsthetics.

If the examiners really wish to introduce extraneous subjects I would like to suggest something more relevant, such as the advanced driving test to ensure punctual attendance by the anæsthetist, or, to the same end, the ability to fly a helicopter.

* * *

First chronic in medical ward: Did you hear that we had a case of syphilis in yesterday?

Second chronic: Thank heaven for that. I'm tired of these glucose drinks.

* * *

The physicians and the psychiatrists are peering at each other across the hypothalamus.—R. Cobbleigh (*Lancet*, Feb. 8, 1958, p. 310).

The G.P.s and the Consultants
Were gathered in a band.
They talked like anything to try
Their cures to understand.
"If this were only done," they said,
"Why—treatment *could* be planned!"

"If seminars and symposia
Can't make it clear to us,
The principle", the Doctors said,
"Remains anonymous."
"Well—call it", said Psychiatrists,
"Just Hy-Po-Thal-A-Mus."

Letters to the Editor

LONG-TERM ANTICOAGULANT TREATMENT FOR CORONARY-ARTERY DISEASE

SIR,—The enthusiasm for long-term "anticoagulants" in your leading article of Feb. 22 makes the unconverted feel like a pagan sinner. We are plagued by confusion. Honey and Truelove's careful study is swept aside with the implication that its facts are embarrassing to the point of indecency. The correspondence that followed its publication was in fact longwinded and tendentious, and even suggested a vested interest in the continuation of "anticoagulant" control. By selective quotation your leader sounds convincing, but it ignores a great deal of evidence, such as the criticisms of much American work by Rytand,[1] or the insignificant differences in frequency of thromboembolic complications noted by Manson and Fullerton,[2] though the latter had a higher mortality in their controls perhaps due to a greater proportion of patients over 60 in this group. Your leader fails to comment on the extraordinary discrepancies between Keyes' work and that of Bjerkeland.[3] Keyes noted a fivefold reduction in death-rate in patients with recurrent infarction, but Bjerkeland found little significant difference between treated and untreated in a similar group of patients: over the age of 60 anticoagulant treatment did little to affect mortality. Surely in the older age-group at greater risk effective preventive measures should be seen at their best. Mortality in reported untreated series varies enormously from 13% to 45%[4] and Toohey's comparison of his treated mortality with *Honey and Truelove's control series* would hardly satisfy a statistician.

But since there is no real evidence that the antiprothrombin group of substances stop or even significantly delay intravascular blood-clotting, perhaps they act in another way. Wright and Kubik[5] suggested that they could accelerate recanalisation of thrombosed veins and arteries. Yet Manchester found postinfarction angina equal in severity in treated and untreated patients.

No, Sir, bitter experience of progressive coronary clotting under our very eyes with optimal "anticoagulant" control leaves us unconvinced that the evidence is as yet adequate to justify vast expenditure on "anticoagulation" services. While anxious to do the best possible to tip the balance even slightly in favour of our patients, let us preserve balanced and critical judgment. Coronary-artery disease presents a spectrum of great width from minimal atheroma with perhaps an unlucky clot at a vital point causing sudden death, to gradual pipe-stem narrowing over decades with hardly a symptom. Occlusion may be thrombotic or due to subintimal hæmorrhage. We have the Duguid view that thrombosis causes atheroma. Others would have us believe that the diet of the Bantu will save us, but the Pietermaritzburg pathologists, Laurie and Woods,[6] think there is as much atheroma in the Bantu as in Barts.

Strong emotional devotion to corn-oil diets or anticoagulant pills will do no good to medicine. Only the most extensive carefully controlled trials on a national scale such as that organised by the Medical Research Council may give us some sort of answer, but only if it is realised that coronary-artery disease is almost universal especially in the male population over middle age, that occlusive clotting is an accident taking place in a few moments on a disorder of the vessel wall which lasts for decades: this accidental concatenation of circumstances accounts for the great variability of course and mortality which seems to baffle many earlier attempts at statistical analysis. Clotting may occur at times of stress, physical or mental, and the reassurance and care of a good doctor may be just as important in its prevention as "anticoagulant" pills.

Postgraduate Medical School,
London, W.12. JOHN MCMICHAEL.

1. Rytand, D. A. *Arch. intern. Med.* 1951, **88**, 207.
2. Manson, D. I., Fullerton, H. W. *Brit. med. J.* 1956, i, 6.
3. Bjerkeland, C. J. *Acta med. scand.* 1957, suppl. 330.
4. Evans, W. *Proc. R. Soc. Med.* 1954, **47**, 320.
5. Wright, H. P., Kubik, M. M. *Brit. med. J.* 1953, i, 1021.
6. Laurie, W., Woods, J. D. *Lancet*, Feb. 1, 1958, p. 231.

SIR,—Your leading article is indeed timely in view of the increasing use of this treatment and the encouraging results reported. My preliminary results in a hundred patients have been very promising and I hope to report on this trial soon. Meanwhile, I should like to comment on a few of your points.

You rightly say that patients are likely to find it irksome to have blood samples taken every few weeks. In all published results so far the maximum interval allowed between blood-tests is 3 to 4 weeks. I have always thought that, where a treatment has to be maintained for years, it is too much to ask patients to attend every few weeks, particularly when they are at work or have to travel a good deal; and, as you mention, with increasing numbers being treated the strain on the hospital services becomes enormous. For these reasons therefore our aim has been to maintain effective control with blood-tests taken at intervals of no less than 2–3 months, and it has been found perfectly feasible to achieve adequate anticoagulant cover without serious mishaps with such infrequent tests. The minimum period between tests for the few patients who are difficult to control is 4 to 5 weeks, but about 90% attend every 8 to 12 weeks. This interval enables patients to live with a minimum of interference, and means smaller clinics, so that more individual attention can be given to each patient. Except for isolated cases a "postal service" is to be avoided, because the patient must be instructed personally in any change of dosage and in other details of the treatment; even written instructions can be misread, as I have learned by experience.

There is a further very important point: too-frequent blood-tests can in fact be misleading and cause inadequate control. The variation between the maximum and minimum maintenance dose in nearly all patients is so small—about 2% to 3%—that the effect of such small changes in the dose cannot be fully gauged for at least 4 to 8 weeks when long-acting drugs (which are best), such as 'Marcoumar', are used or for as much as 3 to 5 weeks when shorter-acting drugs, such as phenindione, are used. To change the dose, therefore, on results of blood-tests taken more frequently is to lead to inaccurate assessment of the dose and inadequate control.

One of the most difficult problems, not emphasised enough, is the question of intercurrent illness. The patient's anticoagulant requirements will then be sharply reduced, particularly if he is not taking his usual diet. It is essential therefore to emphasise, not only to his doctor but also to the patient, the need for more frequent blood-tests during illnesses and the probable necessity for a reduction in the maintenance dose. If oral antibiotics are given at the same time, the risk of bleeding is materially increased. All these details connected with treat-

ment must be frequently repeated to the patient: hence the value of his attending personally for his blood-test.

You quote Manchester's [1] views on the limitations of the present oral anticoagulants: subsequent infarctions occur in spite of anticoagulant therapy. I have not had a single death from proved recurrent infarction, but patients have died of progressive cardiac failure. Something more than long-term anticoagulant therapy is therefore needed to halt the progress of the disease. Whether this can be achieved by diet remains to be proved. I believe that, since a palatable diet can be constructed containing adequate unsaturated fats and a minimum of saturated fats, it is worth while prescribing such diets until more conclusive evidence is available.

As you remark, no half-measures will be effective. My experience for the past 4 years in organising an anticoagulant clinic has shown that effective long-term anticoagulant therapy can be given only in special clinics by doctors experienced in the use of such treatment. The treatment of a few patients by physicians who do not regularly use anticoagulant drugs will inevitably lead to serious mishap or, just as important, to inadequate control with no benefit to the patient.

New End Hospital, London, N.W.3. M. TOOHEY.

SIR,—I should be grateful if any of your readers could explain to me why the most restless, never stationary, constantly disturbed and perhaps most rapidly moving blood in the body—namely, that in the vessels and cavities of the heart—requires anticoagulant therapy to keep it from clotting in the treatment of coronary disease. Indeed, if the clotting power of the blood causes or contributes to coronary occlusion, then in the same person at the same time there should be numerous clotting episodes elsewhere in the body where the blood is far less turbulent.

It seems to me there is little doubt that coronary occlusion is due to occluding factors or to degenerative or inflammatory lesions in the coronary-artery walls, but considerable doubt that the clotting power of the blood plays any significant role. The blood "fats" may play a greater part than we give them credit for.

Port Elizabeth. W. H. CRAIB.

CHLOROTHIAZIDE AND HYPOTENSIVE ACTION OF MECAMYLAMINE

SIR,—Although the observations of Dr. Harington and Dr. Kincaid-Smith (Feb. 22) show that 1–1·5 g. chlorothiazide reduces the urinary elimination of mecamylamine and that this action may be due to an increase in urinary pH, a number of quantitative and temporal considerations suggest that the potentiating effect of chlorothiazide in reducing blood-pressure may be related also to other factors.

Milne et al.[2] have shown that, in the first 24 hours following an oral dose of 10 mg. mecamylamine, the mean total excretion in weakly acid urine is 37%; but it is only 13% when the urine is made alkaline with sodium bicarbonate or acetazolamide, to a pH above 7·5. Although Dr. Harington and Dr. Kincaid-Smith do not report urinary pH values in their paper, in our experience 1 g. chlorothiazide seldom causes such a degree of alkalinity, and the action of mecamylamine may be potentiated with doses as small as 0·25 g. of chlorothiazide.

Quantitatively there appears to be a difference between the hypotensive effects of mecamylamine plus chlorothiazide and of mecamylamine plus acetazolamide: the first combination is usually more potent, yet acetazolamide induces a more alkaline urine.

As Dr. Harington and Dr. Kincaid-Smith point out, the administration of chlorothiazide to a patient already taking mecamylamine may cause, after the first dose, a substantial fall in blood-pressure. This potentiation may occur within 2–6 hours, at a time when, according to fig. 1 in their paper, there is as yet no change in the rate of mecamylamine excretion. It is this speed of action which also makes sodium depletion unlikely to be the sole factor in potentiating the hypotension.

In time, no doubt, this action of chlorothiazide will be completely understood, but any explanation should take into account the potentiation of antihypertensive compounds other than mecamylamine. We agree that by itself chlorothiazide has no hypotensive effect (except perhaps in pre-eclamptic toxæmia), but have found that as little as 0·25 g. of chlorothiazide twice daily may reduce substantially the amount of mecamylamine needed to maintain a satisfactory lowering of blood-pressure and, most important of all, this may reduce to insignificant proportions the uncomfortable side-effects of the latter drug.

R. I. S. BAYLISS
P. R. FLEMING
London, S.W.1. J. R. REES.

1. Manchester, B. *Ann. intern. Med.* 1957, **47**, 1202.
2. Milne, M. D., Rowe, G. G., Somers, K., Muehrcke, R. C., Crawford, M. A. *Clin. Sci.* 1957, **16**, 599.

SHADOW AND SUBSTANCE

SIR,—Dr. Bickford's excellent article (Feb. 22) on the increasing liberties and opportunities extended to his patients, and the results thereof, is encouraging and stimulating.

I agree with him in deploring those who proffer as their sole evidence of progress the existence of an "open door", but equally to be criticised are those who dismiss the topic in scathing terms. The open door is a misplaced term which has become a matter of heated controversy for some psychiatrists, and it is the Morton's Fork upon which more than one luckless candidate has been spiked at an appointments interview.

Whether the ward door is permanently ajar or closed periodically as changing circumstances may dictate is surely of no importance as long as the *concept* of the open door remains within the mind of the patient and his doctors. The open door itself may well be the symbol to a chronically deprived patient that the world is not shut off from him, but the "open door" *concept* of increased opportunities for rehabilitation toward a normal society is what really matters, as Dr. Bickford has illustrated.

To those who advance the open-door system as their contribution to progress I would refer pp. 376–378 of Tuke's *History of the Insane*. Too long to quote in full, the chapter entitled The Open Door System includes:

> "It is only of late years that the disuse of locked doors has been regarded as an important feature in administration . . .
>
> ". . . it became in the interests of the attendant to engage the patient in such occupations as would make them contented, to provide an outlet for their energies, and to direct their minds from thoughts of escape. The relations of an attendant to his patient thus assumed less of the character of a gaoler and more that of a companion or nurse and it was eventually found that this change in character of the form of control could be adopted in the treatment of a much larger number of patients than was at first anticipated . . .

"The number who form a definite purpose to escape really constitutes only a very small proportion . . .

"The special watchfulness required of the attendants in guarding against escape need be directed to only a few . . .

"It appeared further that the disuse of locked doors had an influence on some of the patients in diminishing the desire to escape . . .

"It is year by year becoming more clearly realised that many advantages result from the working of the open door system and *it has now been adopted to a greater or lesser extent in most of the Scotch asylums* . . ."

Progress in 1958? This report was published in 1881.

London, W.1. J. STUART WHITELEY.

SERUM-POTASSIUM LEVEL IN RESPIRATORY FAILURE

SIR,—The observations by Dr. Foulds and her colleagues (Feb. 22) on hyperkalæmia in respiratory acidosis are of considerable interest. Over the past eight years we have studied at least 150 patients with respiratory failure and confirm that moderate hyperkalæmia is not uncommon—especially in severely anoxic patients and in those who are moribund. We have not, however, seen serum-potassium values higher than 7·0 mEq. per litre, even in patients who have died within a few minutes of the blood sample being taken. The accompanying table gives details of some of the cases that we have studied. Blood was collected without hæmolysis, and in most cases serum was separated within thirty minutes.

We should not regard an isolated serum-potassium of less than 7 mEq. per litre as having much clinical significance. Studies in acute renal failure [1 2] indicate that cardiac arrest is unusual until the serum-potassium rises above 8–9 mEq. per litre.

We have been more impressed by the importance of *hypo*kalæmia in respiratory failure—especially in patients treated with mercurial diuretics, acetazolamide, steroids, or chlorothiazide. We believe that, in cor pulmonale, respiratory failure may be potentiated or maintained by potassium deficiency. These observations will be published soon.

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2. Evans, B. M., Hughes Jones, M. C., Milne, M. D., Yellowlees, H. *Lancet*, 1953, ii, 791.

Middlesex Hospital, London, W.1. E. KEITH WESTLAKE.
Chase Farm Hospital, Enfield, Middlesex. THOMAS SIMPSON.

EARLY ADMISSION TO HOSPITAL OF MENTALLY DEFECTIVE BABIES

SIR,—The writers of the interesting letters on home and institutional care of mongols might like to have figures from a private midwifery unit.

3000 babies were born in a period of twelve years; of these 7 were mongols, and 2 stillborn infants had strongly mongoloid features. Of the 7 surviving infants, 4 went to their own homes; 3 are alive and thriving, but in one case the mother has developed a neurosis which, one suspects, began because she had given birth to a mentally defective child; she was 39 and at the age of 25 she had had a healthy illegitimate child adopted.

2 children went to residential nurseries; of these 1 died at 6 months from pneumonia, and the other at 10 months from measles and bronchitis. The third one, an illegitimate child of a woman aged 42, went to a foster-mother and later to hospital, where she died. The diagnosis was congenital heart-disease and pneumonia.

Having observed many families over several years, I do feel they should be given much individual and unhurried advice. There is no doubt that the presence

SERUM-POTASSIUM LEVELS IN RESPIRATORY FAILURE

Case	Age	Sex	Oxygen tent or air	Date	Arterial oxygen saturation (%)	pH	Plasma-CO_2 content (mEq. per litre)	pCO_2 (mm. Hg)	Serum potassium (mEq. per litre)	Serum sodium (mEq. per litre)	Blood-urea (mg. per 100 ml.)	Heart failure	Mersalyl	Progress
1	67	M	A	Jan. 28, 1953	—	6·81	—	—	6·4	—	—	+	+	Died 15 min. later
2	76	M	A	Dec. 18	81·4	7·34	29·3	51·7	—	—	—	+		Died Dec. 24
			O	Dec. 19	100·0	7·28	32·9	66·3	4·3	140	—	+		
3	52	M	A	Jan. 5, 1954	53·4	7·33	36·2	65·7	—	—	—	+		
			O	Jan. 6	97·5	7·07	39·4	102·3	5·5	138	33	+	+	
			A	Jan. 30	88·8	7·40	27·8	43·4	—	—	—	0		Recovered
4	60	M	O	Jan. 8	—	7·03	17·7	61·0	5·0	145	57	0		Died from combined metabolic and respiratory acidæmia 11 hr. later
5	67	F	A	Feb. 2	38·4	7·25	34·3	73·7	6·3	137	132	+		Died 4 hr. later
6	62	M	A	Feb. 2	64·0	7·26	33·6	71·6	5·1	140	39	+		
			O	Feb. 3	100·0	7·26	44·0	97·0	4·6	138	—	+	+	
			O	Feb. 4	100·0	7·33	48·2	110·0	4·9	—	—	+		
			O	Feb. 6	100·0	7·32	52·0	115·0	3·8	132	—	0		
			O	Feb. 7	100·0	7·32	50·6	111·0	4·0	—	—	0	+	
			A	Feb. 7	72·6	7·41	48·7	74·6	3·6	130	—	0		
			O	Feb. 8	94·0	7·12	42·6	121·0	6·2	135	—	0		Died 9½ hr. later
7	67	M	A	Feb. 25	57·5	7·32	36·0	66·5	4·1	150	68	+		
			A	Mar. 2	—	7·19	32·7	74·5	5·7	140	208	0		Died March 3
8	71	F	A	Dec. 10	56·8	7·30	34·4	67·1	—	—	—	0		
			A	Dec. 14	—	—	40·3	—	3·3	—	35	0		Recovered
9	65	M	A	Dec. 16	83·0	7·42	32·7	48·6	—	—	—	+		
			A	Dec. 18	—	—	—	—	2·0	138	31	+	+	
			A	Dec. 21	—	—	31·8	—	4·8	134	54	0		On corticotrophin and KCl; recovered
			A	Jan. 7, 1955	—	7·38	25·3	42·9	—	—	—	0		
10	65	M	A	Jan. 13	79·0	7·36	26·9	46·0	—	—	—	+		
			A	Jan. 15	—	—	—	—	7·0	131	—	+		Died 12 hr. later from massive hæmatemesis from duodenal ulcer
11	49	M	A	Mar. 1	30·0	7·25	36·0	78·0	—	—	—	+		
			A	Mar. 2	—	—	—	—	5·9	126	132	+		
			O	Mar. 6	63·0	7·05	42·0	133·0	—	—	—	+		Died March 9
12	48	M	A	Jan. 3, 1956	—	7·29	41·0	82·0	4·5	142	23	+	+	
			A	Jan. 21	—	7·39	35·0	55·0	—	—	—	0		Recovered

of an older mentally defective patient can put an intolerable strain on a family. From my own experience I would agree that the mother and father of a newborn infant should not be told the worst at the onset. It should be a gradual process. Great consideration should be given to their own mental make-up and, in the case of those who obviously could not take the burden, the decision should be taken for them by a doctor whom they can trust.

Lancashire. MATRON OF MATERNITY HOME.

NYLON-DARN REPAIRS OF HERNIÆ

SIR,—In Mr. Moloney's paper (Feb. 8), and in the subsequent correspondence, no comment has been made on the most serious indictment of nylon used anywhere in the body.

Harrison and Adler [1] have shown that six months after the insertion of nylon into the tissues 80% of its tensile strength is lost—figures which we can confirm from studies made in this department. These workers, however, found that nylon did not seem to degenerate further when left implanted for longer periods. Such loss of strength is almost certainly due to chemical degradation which is to be expected from its chemical structure.

The residuum of tensile strength after six months in the body may well enable nylon to maintain the repair of a hernia, but, to use Mr. Moloney's simile, an engineer would surely be distressed to find the reinforcing bars of his concrete so weakened after so short a time.

'Terylene' ('Dacron') and Courtauld's 'Courlene X3' polyethylene do not so weaken, and may eventually prove to be more satisfactory than nylon.

University Department of Surgery,
The Royal Infirmary,
Sheffield. B. N. CATCHPOLE.

SIR,—It is significant that letters on the use of buried nylon should immediately follow those on septic surgery (Feb. 22), for, in fact, the two problems are really one.

No matter how well constructed the theatre and how careful the technique, perfect asepsis is impossible, and there is *always* some air infection which may alight on sutures before they are inserted.

I have for some time held the view that the failure of the multifilamentous or braided suture is caused by the individual strands of nonabsorbable material being so close together that the defence mechanisms cannot reach airborne infection lying between the strands, so that it can develop to the stage where wound infection becomes obvious.

With the monofilamentous material, on the other hand, the organisms are not protected from the natural defence mechanism, and wounds heal cleanly. With our present standards of asepsis, we must accept it as a fact that *every* surgical wound is infected and that whether nonabsorbable sutures are used or not, it is only the patient's resistance which allows healing by first intention.

Having had the same experience as your other correspondents with multifilamentous sutures, I have used only monofilamentous nylon for over ten years for abdominal wounds as well as herniæ. I found, however, that, particularly in the abdominal wounds, fine nylon (no. 5) occasionally snapped when the patient coughed during convalescence. This problem has been solved by using stainless steel for all the deep repair of herniæ, and reserving nylon for the aponeurosis where the stress is less. As regards method, my personal preference is for the McVey repair.

1. Harrison, J. H., Adler, R. H. *Surg. Gynec. Obstet.* 1956, **103**, 613.

No surgeon can claim that every hernia heals by first intention, but no monofilamentous suture material has had to be removed for more than five years in my cases.

Rochdale. A. M. MCMASTER.

SIR,—The nylon used in the 17 men who developed a chronic sinus after an inguinal hernia repair (described in my letter of Feb. 15) was mostly monofilamentous, no. 8 being the size used most often. In the particular series reported, there were 550 other cases where nylon was not the principal suture material. Only 5 of these developed sinuses—and 3 of these had had a McArthur repair where the fascial strip had been secured with nylon; 2 of these did not heal until a nylon knot had been removed.

I find it impossible, therefore, to agree with Mr. Haxton (Feb. 22) that "in the presence of sepsis wound healing progresses rapidly and without extrusion of the sutures" (where nylon has been used as the suture material). Nor can I agree that "monofilamentous nylon gives less trouble from infection than the other suture materials in common use." Mr. Seth-Smith's experience (Feb. 22) is far more usual than Mr. Haxton's. I do not doubt the value of nylon as a suture material, but in making his choice of the most suitable material for a particular case, a surgeon should be fully aware of the serious disability which often follows the supervention of sepsis where a non-absorbable foreign suture material has been used.

St. Helens,
Lancs. A. J. MARSDEN.

PREMEDICATION FOR GASTROSCOPY

SIR,—I was much interested to read the letter from Mr. Miln (Feb. 15) in which he describes the advantages of chlorpromazine over morphine in the premedication of a patient having gastroscopy.

I gave up using morphine as a premedication for gastroscopy several years ago. The majority of my gastroscopy patients are examined as outpatients, and it is inconvenient to use a substance such as morphine which may have prolonged undesirable effects. This occurred to me most forcibly when I had it myself in the role of a "guineapig" for one of my colleagues who was studying pain and analgesia. Although perfectly well when lying down, I was giddy for several hours when standing up. I have also observed nausea and vomiting in normal subjects to whom I have given morphine for experimental purposes. The chief use of morphine should be to mitigate severe pain. For gastroscopy the main need is to allay anxiety. I have found that amylobarbitone sodium gr. 3 by mouth, given 45 minutes before the examination, is sufficient for this purpose. If the patient is very large or unduly apprehensive the dose can be doubled.

As well as the barbiturate, atropine gr. $^1/_{100}$ is given by injection 45 minutes before the procedure. Atropine, or some similar substance, is essential. Without it, the secretion of mucus is heavy and may obscure the view in the stomach. Brisk salivation during the procedure may embarrass respiration. I found this when I omitted atropine deliberately when studying fibrinolysis in relation to anxiety and wished to see the effect of gastroscopy undisturbed by the pharmacological actions of atropine.

I agree that sucking a lozenge containing an appropriate anæsthetic is sufficient to anæsthetise the throat, though I like to use in addition a gargle of 1% amethocaine, as advocated by Dr. Avery Jones.

Some gastroscopists are in the habit of washing the stomach out before the procedure. This is quite unnecessary in the

always be evaluated in conjunction with other clinical, radiological, and laboratory signs, never separately. It is especially helpful in positive cases for the exclusion of prematurity or overmaturity, less reliable in negative cases where it might sometimes be not recognisable, owing to faulty technique or lack of experience.

Gdańsk Academy of Medicine,
Department of Obstetrics and Gynæcology,
First Woman's Clinic,
Gdańsk, Poland.

JÓSEF BIENIARZ*
ALINA ŚMIGIELSKA.

ÆTIOLOGY OF PRE-ECLAMPTIC TOXÆMIA AND ECLAMPSIA

SIR,—In discussing the increased frequency of toxæmia of pregnancy and pre-eclampsia in patients with beriberi and in areas where pellagra is endemic, Professor Browne (Jan. 18) ascribes this phenomenon to lack of vitamin B.

It may be of interest to draw attention to the relationship between some vitamins of the B complex and the adrenal glands. In patients with beriberi, often characterised by a general dropsy, the adrenals are hyperplastic [1]: when these patients take vitamin B_1 (aneurine) the hyperplasia disappears.

The relation between pellagra-preventing factor (P.P. factor) and the adrenals is under discussion, some authorities suggesting that lack of the P.P. factor causes atrophy of the adrenals. But the P.P. factor alone cannot cause disappearance of all the symptoms of pellagra; to this end tryptophan and riboflavine must also be given. The adrenals play an important part in the synthesis of riboflavine by making possible the conjugation of the components of riboflavine with phosphoric acid.

It is highly probable that the increased frequency of toxæmia of pregnancy and pre-eclampsia in patients with beriberi and pellagra must be ascribed to the adrenals too.

Amsterdam, Holland. R. SCHUURMANS.

ON TAKING THE TEMPERATURE IN THE MOUTH AND THE AXILLA

SIR,—Dr. Loudon's interesting observations [2] on the oral and the axillary temperatures prompt me to describe my experience in recording the body temperature. So far one hundred and thirty healthy people in different age-groups have been examined. Details of a bigger series are expected to be published elsewhere.

One standard half-minute thermometer—a locally popular brand of English make—was used throughout the period of observation. In every case the mercury column was shaken down to 95 F and the instrument placed under the tongue or in the axilla. It was taken out, read, and replaced gently every half-minute till two consecutive readings were identical. The first of the last two readings was recorded as the time required for attaining maximum temperature. It varied between 3 and 5 minutes for the axillary and $1^1/_2$ and 2 minutes for the oral temperature.

While Dr. Loudon's emphasis on various factors influencing the axillary temperature is justified, I might add that a little friction with dry linen to wipe off sweat from the axilla, whether there be any or not—as is common practice here—may considerably increase the recorded temperature, specially in children. In one case the increase was as much as 1°F.

I was, however, more interested in the problem of recording the body temperature of unconscious patients. In unconscious patients the thermometer cannot be safely and properly introduced under the tongue. Therefore, an alternative method of recording the oral temperature could be helpful if it is reasonably accurate.

With that idea in view the thermometer was introduced in the groove between the cheek and the gum as far as it could go and the temperature recorded in the usual way. This was successfully and easily done in several unconscious patients. The time required to record maximum temperature was the same as under the tongue.

The relationship between the temperatures recorded was:

			No. of patients
Under the tongue	<	in the cheek	26
Under the tongue	=	in the cheek	16
Under the tongue	>	in the cheek	88

Generally, therefore, the temperature in the cheek tends to be lower than the temperature under the tongue, but there is a wide range of variation:

Difference	*No. of patients* tongue > cheek	cheek > tongue
0·2°	24	7
0·4°	22	11
0·6°	18	4
0·8°	13	3
1°+	11	1
	88	26

Thus, the temperature recorded in the cheek is not a good substitute for the temperature recorded under the tongue, but can serve as an alternative if necessary, provided allowance is made for possible differences.

Department of Medicine,
Chittaranjan Hospital,
Calcutta, 14. S. N. SENGUPTA.

BED REST, THROMBOSIS, AND EMBOLISM

SIR,—In your comparison last week between modern surgeons and their cavedwelling ancestors, you accuse the lot of fetishism in their postoperative incantations. But, Sir, you omit to mention the small matter of the Atom Age and Stone Age patient. One may imagine the long struggle to get the latter to the stone table, to keep him down—unless hit on the head—during the operation, and finally the patient's sprint, beating ten seconds, to leave the painful scene. Such problems then as breathing and moving did not arise for the palæolithic surgeon! With his physiology equally up to date, the modern surgeon has his difficulties, as it were, in reverse, in an issue between, say, a demand for calm—even in the absence of cameras—and the risk of clotting!

London, W.1. F. D. SANER.

VALIDITY OF THE UREA METHOD FOR ESTIMATING TOTAL BODY-WATER IN MALNUTRITION

SIR,—Dr. FitzGerald (Jan. 11) rightly points out the possibility of incomplete absorption of urea, when given in large doses (of the order of 100 g. a day). We have used only 20 g. in our studies for the estimation of total body-water. Even at this low level the possibility of incomplete absorption of the urea administered was considered by us, especially in view of the altered condition of the gastro-intestinal tract in patients with nutritional œdema. Total body-water was estimated in two normal subjects and in two patients with nutritional œdema, at different levels of urea administration—10 g. and 20 g. The values obtained agreed very closely, both in the normals and in the patients, indicating that, at the low levels of 10 g. and 20 g. of urea, the absorption is probably complete.

It is possible, as Dr. FitzGerald has pointed out, that urea may be broken down into ammonia by the gastric urease, and its distribution in the various fluid compartments may not be strictly uniform, but the fact that the

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1. Abderhalden, E. Lehrbuch Physiologische Chemie; pp. 251, 253. Basle.
2. Loudon, I. S. L. *Lancet*, 1957, ii, 233.

values obtained by the simultaneous use of antipyrin and urea were nearly similar would indicate that these factors are not of such magnitude as to interfere with the estimation.

Nutrition Research Laboratories, Coonoor, S. India S. G. SRIKANTIA C. GOPALAN.

THE LIFE FOR ME

SIR,—Dr. Scott (Feb. 15) rightly criticises me for not plugging preventive psychiatry (though in all fairness I did give it a passing mention). It isn't easy to cover one's whole specialty in two and a half brisk columns.

It is good news that he and some psychiatrists are cooperating in preventive work, and I look forward indeed to hearing more about it. He mentions clinics, though I have an awful feeling that he is only referring to child-guidance work; these weren't the ones I was referring to in the Widdicombe File: I was harking back to the infant-welfare and toddlers and all that; whereas the good G.P. is well-enough qualified to take these over, I rather doubt if many would be happy as child psychiatrists, let alone set aside a corner of their surgeries for the usual clinic accretion of sand, water, and shattered toys. But if Dr. Scott thinks child-guidance clinics are preventive I must disagree: the ones I worked in were dealing only with disturbed children; to say that they are preventive *because* treatment early means less delinquency and neurosis is much the same to me as saying that major surgery is preventive because you hope to prevent the patient's death. The only approach to real preventive psychiatry that I have yet heard of appears in what I believe are the terms of reference of the Ingleby Committee—namely, to consider whether local authorities should have new powers to prevent or forestall the sufferings, mental and physical, of children in their own homes. I must say I hope they get them.

Far from being antipathetic towards child guidance, may I assure Dr. Scott that I wouldn't mind going in for it myself. Perhaps I may interject, though, that these S.H.M.O. vacancies don't interest me much: it will be consultancy or nothing; and I'm afraid the same goes for my pals.

Widdicombe-in-the-Moor. RICHARD COBBLEIGH.

THE DOCTOR'S ATTITUDE TO HIS PATIENT

SIR,—As I read Dr. Ryle's letter last week, I surmised that Dr. Ryle must be a competent well-qualified young man with several hospital jobs to his credit, but with less than ten years' experience of general practice. My surmise was confirmed by reference to *The Medical Directory*. Even Dr. Ryle, who feels he can write more easily than others about scientific detachment, is writing within a circumscribed pattern that can be discerned by his less scientific colleagues.

Dr. Ryle feels that the personality of the doctor is receiving too much attention in the description and investigation of disease, and that "facts, based on observation and experience, can guide our actions irrespective of our personalities . . ." The trouble is that if we practitioners do not take our personalities into account, we pick up the wrong facts and come to the wrong conclusions, and we ignore the reality of functional or stress disorders which form such a large part of our work.

When, for example, we investigate a case of dyspepsia by a scientific inquiry related to the function of the stomach, and find no abnormality, we make a diagnosis of functional disorder and reassure the patient there is nothing really wrong as no organic disease can be found. We get a little ruffled when the patient turns up a few weeks later asking for more X-rays as his symptoms have continued unabated in spite of our reassurance; and it is only when we can make a personality change, by realising that we have been reassuring ourselves and not the patient, that we can take further steps to help the patient. What a small, and yet what a vast, change takes place when we stop asking our patients detailed questions about their functional disorders and attempt to listen to the expression of their real feelings and fears! In such cases we lay aside the tools of scientific inquiry that are used for the investigation of organic disease, and pick up the tools that help us to interpret the language of functional disorder—a language that has still to be learnt by the medical profession.

Dr. Ryle writes of the need for scientific detachment. This is easier for the hospital doctor to achieve, as so many hospital patients learn to their cost. Perhaps the main difference between hospital and general practice is this very matter of detachment, the too-objective approach in hospital and the too-subjective approach in general practice. The validity of Dr. Clyne's article of Feb. 1 cannot be in doubt. The masterly way in which Dr. Clyne gave verbal expression to his attitude towards his patient made me feel that here at last was an attempt to describe the very stuff of general practice.

London, W.8. H. STEPHEN PASMORE.

A PLASTIC APPROACH TO SURGERY

SIR,—If a scientific communication is to be understood universally it is essential that terms should be used with accuracy and precision. When Mr. Heanley uses the term Langer's lines he can scarcely object if a reader assumes that he means the lines described by Langer. From the definition which he now gives (Feb. 22) it appears that this is not so. Unfortunately his definition is not of a Langer's line but rather of what he might have called with more accuracy a "line of election for surgical incision". As I pointed out (Jan. 25) the two terms are not synonymous.

On the question of priority of description Wood Jones [1] makes some interesting observations which are also at variance with Mr. Heanley's statements.

Glasgow Royal Infirmary. IAN A. MCGREGOR.

RADIOSTRONTIUM IN BONES

SIR,—The following observations are based on reading your informative annotations and articles during the past year, and some of the publications which you have reviewed.

Some indication of the possible world-wide increase in the distribution of strontium 90 is given by the following figures quoted from an A.E.R.E. report [2]:

Concentration on ground on Jan. 1, 1956 ..	4·5 mc. per sq. km.
Maximum concentration on ground due to bombs exploded by that date (this will be reached in about 1969)	14 mc. per sq. km.
Equilibrium value (reached in about 100 years' time) if the present rate of weapon firing continues indefinitely	200 mc. per sq. km.

Bryant et al.[3] show clearly the routes by which strontium 90 is already entering the human body (e.g., rain, soil, grass and other crops, cow's milk) and they say:

"The highest ^{90}Sr activity in human bone found in our series to the end of 1956 is 1·55 S.U. which is 1/60 of the maxi-

1. Wood Jones, F. The Principles of Anatomy as Seen in the Hand; p. 102 et seq. London, 1944.
2. Stewart, N. G., Crooks, R. N., Fisher, E.M.R. The Radiological Dose to Persons in the U.K. due to Debris from Nuclear Test Explosions prior to January, 1956. A. E. R. E. HP/R 2017. H.M. Stationery Office.
3. Bryant, F. J., Chamberlain, A. C., Morgan, A., Spicer, G. S. Radiostrontium in Soil, Grass, Milk, and Bone in the United Kingdom. A.E.R.E. HP/R 2353. H.M. Stationery Office. See *Lancet*, 1957, ii, 942.

majority of patients. What I do myself is to tell the patient to eat no solid food but to have one or two cups of tea on the morning of the examination. The stomach is then washed through in a way agreeable to the subject. The only exception is if the barium-meal examination, which must precede any gastroscopy, has shown evidence of pyloric stenosis with retention of gastric contents.

Nuffield Department of Clinical Medicine, Radcliffe Infirmary, Oxford. S. C. TRUELOVE.

LEG SUPPORT FOR USE DURING VAGINAL OPERATIONS

SIR,—I have noted with interest the description of leg supports by Mr. T. B. FitzGerald.[1] They seem, however, to have some disadvantages.

Extreme abduction of the thighs, as shown in the photograph, is accompanied by pronounced lordosis of the lumbar spine, and this, in turn, is followed by postoperative backache.[2]

1. *Lancet*, 1957, ii, 577.
2. Hunter, R. G., Henry, G. W., Larsen, J. J. *Obstet. Gynec.* 1954, **4**, 344.

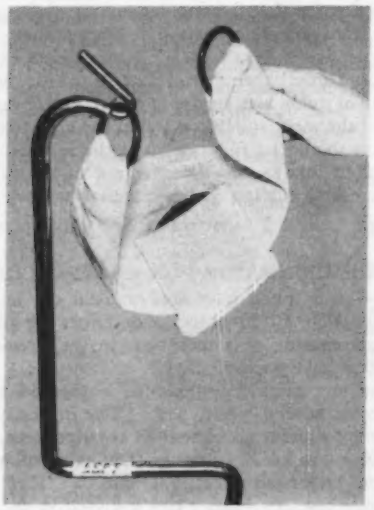

Fig. 1

Fig. 2

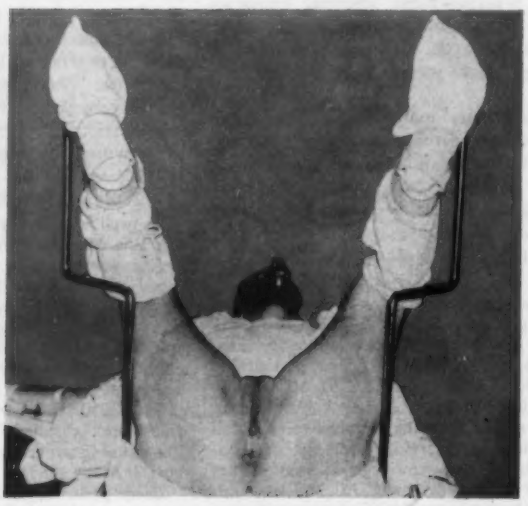

Fig. 3

The popliteal vessels are compressed by the proximal free edge of the canvas support.

Moreover, it seems from the illustration and the description that the assistants do not have free access to the field of operation.

For several years I have used a modification (see accompanying figures) of the leg support described by Waddell,[3] which has the following features to recommend it:

(1) The feet are supported by a simple half-boot made of 3-inch-wide canvas webbing, with a sponge-rubber pillow behind the tendo achillis (fig. 1).

(2) The thighs are not abnormally abducted, and adjustment can easily be made for flexion and extension of the knees and abduction and adduction of the thighs (figs. 2 and 3).

(3) There is no pressure on the leg or thigh at any point.

(4) The feet can be placed in the boot with great ease.

(5) The assistants have unobstructed access to the field of operation. All can be seated if desired.

(6) Backache due to the lithotomy position is not a complication when this apparatus is properly used.

Manitoba Clinic, Winnipeg, Manitoba. A. M. GOODWIN.

3. Waddell, W. R. *Amer. J. Obstet. Gynec.* 1949, **58**, 818.

SPINAL ANÆSTHESIA

SIR,—Mr. Lake's plea (Feb. 22) for a new interest in spinal anæsthesia is thought-provoking and persuasive. Nevertheless, I strongly support the conclusion of your annotation that the hazard of permanent damage to the nervous system is a serious one. In my practice as an orthopædic surgeon, spinal anæsthesia was frequently used in the past. I never had any serious complications such as paraplegia. There was one case of persistent incomplete paralysis and headache. Other surgeons in the area were not so fortunate and a few years ago it was a well-known fact that one solicitor, a man of high principles and of an excellent reputation, was so convinced of the dangers of this method of anæsthesia that the litigation he instituted might almost be said to constitute a vendetta.

I cannot help feeling that Mr. Lake has omitted in his list of risks a very important hazard—namely, damage to an intervertebral disc. Quite apart from the question of spinal anæsthesia many cases of infection of intervertebral discs have been recorded in the past ten to fifteen years as a result of lumbar punctures which one must presume were inexpertly carried out. These cases prove that the intervertebral discs can be infected by the lumbar-puncture needle. In the course of obtaining the history of many hundreds of patients suffering from backache, lumbago, and sciatica it was forced on my consciousness that an extremely high number related the onset of their symptoms to an operation performed under spinal

anæsthesia. Very occasionally, the onset was related to an operation performed under general anæsthesia and this must be mentioned even though it appears to destroy the force of my argument. However, some of these operations involved the lithotomy position. Since the number of operations performed under spinal anæsthesia has dropped this history has not been obtained. It was these cases, more than anything else, which caused me to prohibit the use of spinal anæsthetics for my patients.

Manchester. W. SAYLE-CREER.

INFANTILE GASTROENTERITIS

SIR,—Dr. Librach (Feb. 22) has made it abundantly plain that he does not believe in the pathogenicity of serotypes of *Escherichia coli* in infantile enteritis. *Hæmophilus influenzæ*, he says, was once held to be the cause of influenza, now known to be a virus disease; therefore, the laboratory has misled and hindered the clinician. He then implies that the laboratory work on the serology of *Esch. coli* has done a similar disservice to medicine by confusing rather than explaining the ætiology of infective enteritis in infants.

He does not disclose his reasons for doubting all the work which has been published on the subject during the past 10 years. He has quoted a passage from a paper [1] of which I was one of the authors. Lifted out of its context this quotation would suggest that the authors themselves doubted the significance of finding *Esch. coli* type O.111 in infantile enteritis. This is not the case; the quoted passage does not represent the thesis of the paper in question, nor does it reflect the views of its authors at the time when it was written, much less so now.

City General Hospital, Stoke-on-Trent. C. GILES.

SUDDEN DEAFNESS

SIR,—Mr. Boyes Korkis (Feb. 22) rightly stresses the need for treating patients with sudden perceptive deafness "as an absolute emergency". He goes on to say that "a therapeutic trial of a stellate block would yield useful information and if carried out early enough would have a greater chance of success". I can assure Mr. Korkis it not only *would* but *does*.

Like Mr. Korkis, I do not advocate the use of intravenous nicotinic acid because I cannot see the advantage of this over a stellate block. Audiograms should be done immediately before the block and half an hour after under good conditions by a skilled technician in every case, and an efficient vasodilator drug—I use buphenine ("Perdilatal")—plays (not "could play") an important part in maintaining the good effect of a successful stellate block.

Mr. Korkis goes on to say that the old expectant attitude in sudden deafness of this type must change to one of action. I agree, but it must change similarly in the treatment of Ménière's disease.[2] Having done about 600 stellate blocks for inner-ear disorders during the past five years, under ideal audiometric conditions, having produced on many occasions a significant rise in hearing by stellate block, and having demonstrated by visual observation and lately by nystagmography the complete return of vestibular function after sympathetcomy, I am convinced that many cases of sudden deafness of perceptive type—especially in young patients—have an ætiology essentially similar to that of Ménière's disease, and that the new approach to these disorders, first demonstrated by Mr. E. Garnett Passe, has gone for too long without recognition.

Tyrone County Hospital. T. J. WILMOT.

1. Giles, C., Sangster, G. *J. Hyg., Camb.* 1948, **46**, 1.
2. Wilmot, T. J. *Brit. med. J.* 1957, ii, 1047.

CLINICAL GERIATRICS

SIR,—May I thank and commend you for your annotation on this topic last week? The special problems associated with the care of elderly patients are not known as well as they might be. The present medical curriculum gives students little teaching and less experience in this branch of medicine. In consequence, when they go into practice, they find themselves confronted with unfamiliar situations for which they have not been prepared by their teachers. Is it not time to press for more clinical instruction in geriatrics? Surely the changes in our population make the care of elderly patients one of the most important tasks confronting our profession in this day and age.

London, S.W.16. TREVOR H. HOWELL.

SOFT-TISSUE RADIOGRAPHY IN ESTIMATING FŒTAL MATURITY AND POSTMATURITY

SIR,—Your leading article of Feb. 1 is really encouraging. Every experienced obstetrician knows the difficulties and fallacies in the evaluation of the advancement of pregnancy. These difficulties in the diagnosis of fœtal maturity are sometimes even greater with overmaturity, a problem which was repeatedly discussed in recent issues of your journal [1–3] although from the therapeutic point of view only. The diagnosis of prolonged pregnancy is certainly as great a problem as its therapy.

Hartley's critical analysis of the value of the appearance of epiphyseal calcifications for the diagnosis of the duration of pregnancy and the good results achieved by him in Manchester are reassuring. I should like to add one sign which for the past ten years has been very helpful in assessing fœtal maturity and overmaturity in our X-ray diagnosis laboratory.

Fat tissue is accumulated only in the last weeks of fœtal life and the subcutaneous tissue of premature fœtus or newborn is almost devoid of fat coat. On X-ray pictures of premature pregnancies the subcutaneous fat-tissue shadow is usually easily discernible especially on the buttocks, the knees, and the elbows as a distinct subcutaneous shadow line of 1–3 mm. thickness. The presence of this sign allows for the diagnosis of a full-term fœtus, with the one exception of a diabetic pregnancy where a giant fœtus might show this symptom much earlier (where, anyhow, it might add to the indications of an earlier termination of pregnancy).

In a prolonged pregnancy in which there is a deteriorating caloric supply through the degenerating, senescent placenta the fœtus has to use up its own energy stocks—in the first place, its subcutaneous fat tissue. The disappearance of the subcutaneous fat-tissue shadow, especially if it was easily visible on a previous X-ray picture a week or two before, speaks for the diagnosis of a biologically prolonged pregnancy and for the necessity of a prompt termination of pregnancy, because of danger of anoxia and fœtal distress.

If there has been no previous X-ray, as often happens, a large fœtus with a fully developed and well-calcified skeleton but without a visible subcutaneous fat-tissue shadow is always suspect for overmaturity. A high standard of radiographic technique is essential. This sign must

1. Gibberd, G. F. *Lancet*, Jan. 11, 1958, p. 64.
2. Parker, R. B. *ibid.* Feb. 1, p. 265.
3. Watson, P. S. *ibid.*

always be evaluated in conjunction with other clinical, radiological, and laboratory signs, never separately. It is especially helpful in positive cases for the exclusion of prematurity or overmaturity, less reliable in negative cases where it might sometimes be not recognisable, owing to faulty technique or lack of experience.

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JÓSEF BIENIARZ*
ALINA ŚMIGIELSKA.

ÆTIOLOGY OF PRE-ECLAMPTIC TOXÆMIA AND ECLAMPSIA

SIR,—In discussing the increased frequency of toxæmia of pregnancy and pre-eclampsia in patients with beriberi and in areas where pellagra is endemic, Professor Browne (Jan. 18) ascribes this phenomenon to lack of vitamin B.

It may be of interest to draw attention to the relationship between some vitamins of the B complex and the adrenal glands. In patients with beriberi, often characterised by a general dropsy, the adrenals are hyperplastic [1]: when these patients take vitamin B_1 (aneurine) the hyperplasia disappears.

The relation between pellagra-preventing factor (P.P. factor) and the adrenals is under discussion, some authorities suggesting that lack of the P.P. factor causes atrophy of the adrenals. But the P.P. factor alone cannot cause disappearance of all the symptoms of pellagra; to this end tryptophan and riboflavine must also be given. The adrenals play an important part in the synthesis of riboflavine by making possible the conjugation of the components of riboflavine with phosphoric acid.

It is highly probable that the increased frequency of toxæmia of pregnancy and pre-eclampsia in patients with beriberi and pellagra must be ascribed to the adrenals too.

Amsterdam, Holland. R. SCHUURMANS.

ON TAKING THE TEMPERATURE IN THE MOUTH AND THE AXILLA

SIR,—Dr. Loudon's interesting observations [2] on the oral and the axillary temperatures prompt me to describe my experience in recording the body temperature. So far one hundred and thirty healthy people in different age-groups have been examined. Details of a bigger series are expected to be published elsewhere.

One standard half-minute thermometer—a locally popular brand of English make—was used throughout the period of observation. In every case the mercury column was shaken down to 95° F and the instrument placed under the tongue or in the axilla. It was taken out, read, and replaced gently every half-minute till two consecutive readings were identical. The first of the last two readings was recorded as the time required for attaining maximum temperature. It varied between 3 and 5 minutes for the axillary and $1^1/_2$ and 2 minutes for the oral temperature.

While Dr. Loudon's emphasis on various factors influencing the axillary temperature is justified, I might add that a little friction with dry linen to wipe off sweat from the axilla, whether there be any or not—as is common practice here—may considerably increase the recorded temperature, specially in children. In one case the increase was as much as 1°F.

I was, however, more interested in the problem of recording the body temperature of unconscious patients. In unconscious patients the thermometer cannot be safely and properly introduced under the tongue. Therefore, an alternative method of recording the oral temperature could be helpful if it is reasonably accurate.

With that idea in view the thermometer was introduced in the groove between the cheek and the gum as far as it could go and the temperature recorded in the usual way. This was successfully and easily done in several unconscious patients. The time required to record maximum temperature was the same as under the tongue.

The relationship between the temperatures recorded was:

			No. of patients
Under the tongue	<	in the cheek	26
Under the tongue	=	in the cheek	16
Under the tongue	>	in the cheek	88

Generally, therefore, the temperature in the cheek tends to be lower than the temperature under the tongue, but there is a wide range of variation:

Difference	*No. of patients*	
	tongue > cheek	*cheek > tongue*
0·2°	24	7
0·4°	22	11
0·6°	18	4
0·8°	13	3
1°+	11	1
	88	26

Thus, the temperature recorded in the cheek is not a good substitute for the temperature recorded under the tongue, but can serve as an alternative if necessary, provided allowance is made for possible differences.

Department of Medicine,
Chittaranjan Hospital,
Calcutta, 14. S. N. SENGUPTA.

BED REST, THROMBOSIS, AND EMBOLISM

SIR,—In your comparison last week between modern surgeons and their cavedwelling ancestors, you accuse the lot of fetishism in their postoperative incantations. But, Sir, you omit to mention the small matter of the Atom Age and Stone Age patient. One may imagine the long struggle to get the latter to the stone table, to keep him down—unless hit on the head—during the operation, and finally the patient's sprint, beating ten seconds, to leave the painful scene. Such problems then as breathing and moving did not arise for the palæolithic surgeon! With his physiology equally up to date, the modern surgeon has his difficulties, as it were, in reverse, in an issue between, say, a demand for calm—even in the absence of cameras—and the risk of clotting!

London, W.1. F. D. SANER.

VALIDITY OF THE UREA METHOD FOR ESTIMATING TOTAL BODY-WATER IN MALNUTRITION

SIR,—Dr. FitzGerald (Jan. 11) rightly points out the possibility of incomplete absorption of urea, when given in large doses (of the order of 100 g. a day). We have used only 20 g. in our studies for the estimation of total body-water. Even at this low level the possibility of incomplete absorption of the urea administered was considered by us, especially in view of the altered condition of the gastro-intestinal tract in patients with nutritional œdema. Total body-water was estimated in two normal subjects and in two patients with nutritional œdema, at different levels of urea administration—10 g. and 20 g. The values obtained agreed very closely, both in the normals and in the patients, indicating that, at the low levels of 10 g. and 20 g. of urea, the absorption is probably complete.

It is possible, as Dr. FitzGerald has pointed out, that urea may be broken down into ammonia by the gastric urease, and its distribution in the various fluid compartments may not be strictly uniform, but the fact that the

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1. Abderhalden, E. Lehrbuch Physiologische Chemie; pp. 251, 253. Basle.
2. Loudon, I. S. L. *Lancet*, 1957, ii, 233.

values obtained by the simultaneous use of antipyrin and urea were nearly similar would indicate that these factors are not of such magnitude as to interfere with the estimation.

Nutrition Research Laboratories, Coonoor, S. India — S. G. SRIKANTIA, C. GOPALAN.

THE LIFE FOR ME

SIR,—Dr. Scott (Feb. 15) rightly criticises me for not plugging preventive psychiatry (though in all fairness I did give it a passing mention). It isn't easy to cover one's whole specialty in two and a half brisk columns.

It is good news that he and some psychiatrists are cooperating in preventive work, and I look forward indeed to hearing more about it. He mentions clinics, though I have an awful feeling that he is only referring to child-guidance work; these weren't the ones I was referring to in the Widdicombe File: I was harking back to the infant-welfare and toddlers and all that; whereas the good G.P. is well-enough qualified to take these over, I rather doubt if many would be happy as child psychiatrists, let alone set aside a corner of their surgeries for the usual clinic accretion of sand, water, and shattered toys. But if Dr. Scott thinks child-guidance clinics are preventive I must disagree: the ones I worked in were dealing only with disturbed children; to say that they are preventive *because* treatment early means less delinquency and neurosis is much the same to me as saying that major surgery is preventive because you hope to prevent the patient's death. The only approach to real preventive psychiatry that I have yet heard of appears in what I believe are the terms of reference of the Ingleby Committee—namely, to consider whether local authorities should have new powers to prevent or forestall the sufferings, mental and physical, of children in their own homes. I must say I hope they get them.

Far from being antipathetic towards child guidance, may I assure Dr. Scott that I wouldn't mind going in for it myself. Perhaps I may interject, though, that these S.H.M.O. vacancies don't interest me much: it will be consultancy or nothing; and I'm afraid the same goes for my pals.

Widdicombe-in-the-Moor. RICHARD COBBLEIGH.

THE DOCTOR'S ATTITUDE TO HIS PATIENT

SIR,—As I read Dr. Ryle's letter last week, I surmised that Dr. Ryle must be a competent well-qualified young man with several hospital jobs to his credit, but with less than ten years' experience of general practice. My surmise was confirmed by reference to *The Medical Directory*. Even Dr. Ryle, who feels he can write more easily than others about scientific detachment, is writing within a circumscribed pattern that can be discerned by his less scientific colleagues.

Dr. Ryle feels that the personality of the doctor is receiving too much attention in the description and investigation of disease, and that "facts, based on observation and experience, can guide our actions irrespective of our personalities . . ." The trouble is that if we practitioners do not take our personalities into account, we pick up the wrong facts and come to the wrong conclusions, and we ignore the reality of functional or stress disorders which form such a large part of our work.

When, for example, we investigate a case of dyspepsia by a scientific inquiry related to the function of the stomach, and find no abnormality, we make a diagnosis of functional disorder and reassure the patient there is nothing really wrong as no organic disease can be found. We get a little ruffled when the patient turns up a few weeks later asking for more X-rays as his symptoms have continued unabated in spite of our reassurance; and it is only when we can make a personality change, by realising that we have been reassuring ourselves and not the patient, that we can take further steps to help the patient. What a small, and yet what a vast, change takes place when we stop asking our patients detailed questions about their functional disorders and attempt to listen to the expression of their real feelings and fears! In such cases we lay aside the tools of scientific inquiry that are used for the investigation of organic disease, and pick up the tools that help us to interpret the language of functional disorder—a language that has still to be learnt by the medical profession.

Dr. Ryle writes of the need for scientific detachment. This is easier for the hospital doctor to achieve, as so many hospital patients learn to their cost. Perhaps the main difference between hospital and general practice is this very matter of detachment, the too-objective approach in hospital and the too-subjective approach in general practice. The validity of Dr. Clyne's article of Feb. 1 cannot be in doubt. The masterly way in which Dr. Clyne gave verbal expression to his attitude towards his patient made me feel that here at last was an attempt to describe the very stuff of general practice.

London, W.8. H. STEPHEN PASMORE.

A PLASTIC APPROACH TO SURGERY

SIR,—If a scientific communication is to be understood universally it is essential that terms should be used with accuracy and precision. When Mr. Heanley uses the term Langer's lines he can scarcely object if a reader assumes that he means the lines described by Langer. From the definition which he now gives (Feb. 22) it appears that this is not so. Unfortunately his definition is not of a Langer's line but rather of what he might have called with more accuracy a "line of election for surgical incision". As I pointed out (Jan. 25) the two terms are not synonymous.

On the question of priority of description Wood Jones [1] makes some interesting observations which are also at variance with Mr. Heanley's statements.

Glasgow Royal Infirmary. IAN A. MCGREGOR.

RADIOSTRONTIUM IN BONES

SIR,—The following observations are based on reading your informative annotations and articles during the past year, and some of the publications which you have reviewed.

Some indication of the possible world-wide increase in the distribution of strontium 90 is given by the following figures quoted from an A.E.R.E. report [2]:

Concentration on ground on Jan. 1, 1956 ..	4·5 mc. per sq. km.
Maximum concentration on ground due to bombs exploded by that date (this will be reached in about 1969)	14 mc. per sq. km.
Equilibrium value (reached in about 100 years' time) if the present rate of weapon firing continues indefinitely	200 mc. per sq. km.

Bryant et al.[3] show clearly the routes by which strontium 90 is already entering the human body (e.g., rain, soil, grass and other crops, cow's milk) and they say:

"The highest ^{90}Sr activity in human bone found in our series to the end of 1956 is 1·55 S.U. which is 1/60 of the maxi-

1. Wood Jones, F. The Principles of Anatomy as Seen in the Hand; p. 102 et seq. London, 1944.
2. Stewart, N. G., Crooks, R. N., Fisher, E.M.R. The Radiological Dose to Persons in the U.K. due to Debris from Nuclear Test Explosions prior to January, 1956. A. E. R. E. HP/R 2017. H.M. Stationery Office.
3. Bryant, F. J., Chamberlain, A. C., Morgan, A., Spicer, G. S. Radiostrontium in Soil, Grass, Milk, and Bone in the United Kingdom. A.E.R.E. HP/R 2353. H.M. Stationery Office. See *Lancet*, 1957, ii, 942.

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mum permissible for the general population, and 1/6 of the level above which 'immediate consideration would be required'."

A conclusion which appears clear from these figures is that the strontium-90 content of children's bones will increase during the next ten years, even if there are no more test explosions. With regard to the future, if similar explosions are continued, the figures quoted above appear to be the "writing on the wall" which could not be much clearer.

London, S.W.1. ROY C. HOATHER.

INTRATHECAL PHENOL FOR INTRACTABLE PAIN

SIR,—Following the paper by Dr. Nathan and Dr. Scott (Jan. 11), I should like to call attention to my letter in your columns last year.[1] I pointed out that a watery solution of phenol injected into the perineural tissue through the first or second sacral foramen is highly efficacious in all forms of sciatica and in intractable pain, and does not cause any undesirable side-effects.

I think this is a simple and safe method and does not necessitate the use of 'Myodil', silver nitrate, or the intrathecal application of phenol.

St. Istvan Hospital, Budapest. T. LEHOCZKY.

167-78C

4-4'-DIAMIDINODIPHENYLAMINE IN MYELOMATOSIS

SIR,—I should like to draw attention to the encouraging results which have been obtained in the treatment of myelomatosis with 4-4'-diamidinodiphenylamine dihydrochloride (M. & B. 938).

This drug has previously been used in bronchopulmonary aspergillosis,[2] and it is chemically related to pentamidine and hydroxystilbamidine, which have been used in myelomatosis with only symptomatic improvement.[3 4] Because of this chemical relationship I decided to try its effect on myelomatosis.

A man aged 36 was admitted to Charing Cross Hospital in August, 1953, with a history of pain in the right buttock for two years. A cavity in the sacrum was curetted at operation, and biopsy showed plasma-cell myeloma. A short course of radiotherapy was then given to the sacral area. Radiographs showed two sharply defined osteolytic lesions in the skull so it was decided to give 4-4'-diamidinodiphenylamine. Daily intravenous injections were given and the total dose was 1·2 g. in a fortnight.

The patient remained well until July, 1954, when he had sudden pain in the chest. Radiographs showed osteolytic lesions in the ribs. By January, 1955, his condition was worse and the erythrocyte-sedimentation rate was 70 mm. in one hour (Westergren). Another course of the drug was given but on this occasion a total dosage of 1·7 g. was spread over five weeks. By the end of the course the patient was completely free of pain. When last seen in October, 1957, the patient was perfectly well, the E.S.R. had fallen to 22 mm. in one hour and there was recalcification of the skull lesions.

Myelomatosis is invariably fatal and the untreated disease advances steadily. It is generally agreed that although pentamidine and hydroxystilbamidine sometimes relieve bone pain, the progress of the disease is unaffected. Recalcification may follow radiotherapy and has been reported after treatment with urethane.[5] Spontaneous recalcification must be rare, and according to Boyd it never occurs.[6]

Although the above results were obtained in a single case and cannot carry much weight, they do suggest that the drug is worthy of trial in myelomatosis. A dose of 0·1 g. intravenously twice weekly is well tolerated and experience suggests that this should be continued to a total dosage of 2 g.

Edinburgh. H. W. C. WARD.

THE DIFFICULT KNEE

SIR,—In your annotation[7] you discuss the errors of diagnosis revealed at meniscectomy, and comment that the problems of meniscectomy are wider than one recent series suggests.

Neither Murdoch nor you, however, mention the risk of failing to diagnose rheumatoid arthritis when it presents as internal derangement of the knee-joint. It seems likely that this omission can be largely attributed to:

(1) Inadequate follow-up of meniscectomy patients in general.

(2) Continuing lack of awareness that rheumatoid arthritis quite commonly begins as a monarticular arthritis.

(3) Failure to appreciate that rheumatoid arthritis itself can produce internal derangement.

Patients who develop recurrent knee-joint effusion following trauma, and who give a history of locking and instability that is not quite typical of a torn internal cartilage, are often diagnosed as "cartilages" and not infrequently subjected to meniscectomy. Both operated and unoperated patients with this diagnosis present themselves here with rheumatoid arthritis that is quite definite by the American Rheumatism Association criteria, and this may well be the experience of physicians in charge of rheumatic clinics in other parts of the world. War pensioners who are necessarily subjected to follow-up examination for a prolonged period form a fruitful source of case material and sometimes bear bilateral meniscectomy scars before their rheumatoid arthritis involves a sufficient number of joints to become embarrassingly obvious. One does not doubt that some of these patients did indeed have torn cartilages, but the significance of such lesions in the production of their symptoms is another matter.

It is well known that nipping of hypertrophied rheumatoid synovial fringes can cause internal derangement of the knee-joint, the implication being that this occurs with such gross involvement that it would not easily be missed. There is, however, a tendency, in less florid cases, for firm and fibrous synovial tags to form in a remarkably constant position, just deep to the inferolateral border of the patella. Although these are usually of quite minor significance, they may on occasion produce considerable disability, from instability and locking. This responds satisfactorily to removal of the offending tag, a minor orthopædic procedure. In addition to its simplicity, this has the merit of saving the rheumatoid patient from fruitless exploration in search of a torn "posterior horn" or a cyst of the external cartilage. These latter conditions receive more emphasis in standard textbooks, and therefore spring first to mind in the consideration of the difficult knee.

It would appear from the article by Treanor et al.[8] on unusual sites of presentation of rheumatoid arthritis that our experience here is not unique. They mention cases in which surgical treatment of a solitary affected joint is advised; the real diagnosis being considered only after this fails to cure. Grokoest

1. *Lancet*, 1957, i, 379.
2. Hinson, K. F. W., Moon, A. J., Plummer, N. S. *Thorax*, 1952, **7**, 317.
3. Snapper, I. *J. Amer. med. Ass.* 1947, **133**, 157.
4. Snapper, I. *J. Mt Sinai Hosp.* 1948, **15**, 156.
5. Loge, J. P., Rundles, R. W. *Blood*, 1949, **4**, 201.
6. Boyd, W. Text-book of Pathology; p. 907. London, 1953.
7. *Lancet*, 1957, ii, 1209.
8. Treanor, W. J., Grant, A. E., Psaki, R. D. *Arch. phys. Med Rehab.* 1956, **37**, 699.

et al.[9] recently reviewed 110 patients with juvenile rheumatoid arthritis, and found that 39% had monarticular onset. In *none* of these was the diagnosis of rheumatoid arthritis mentioned during the initial evaluation.

This stimulated Mr. Peters, an Otago medical student who was working here, to review our own cases of juvenile rheumatoid arthritis. He found that 38% of our patients had a monarticular onset recorded in their histories. Again, none of these children had been originally diagnosed as rheumatoid arthritis.

Queen Elizabeth Hospital,
Rotorua, New Zealand. B. S. ROSE.

Parliament

Artificial Insemination

THE debate in the House of Lords on Feb. 26 on this subject was not confined to LORD BLACKFORD's narrow motion that artificial insemination of a married woman by a donor other than her husband is tantamount to adultery, but ranged freely over the moral, medical, and legal difficulties with which the practice is beset.

Lord Blackford himself opened the debate by offering some facts and figures. This, he admitted, was not easy because of the cloak-and-dagger secrecy with which the procedure was surrounded. No doubt there had been isolated instances ever since John Hunter in 1790 produced by this means a baby for a linen-draper's wife. But as a recognised branch of medical practice it went back only some twenty years. In 1938 a small group of scientists and doctors was formed under the ægis of the late Sir William Gilliatt and the late Sir Charles Read to experiment in this operation. The group broke up after ten years because its members had come to the conclusion that their experiments were bad from the point of view of the child and because so many of the couples who approached them were unsuited to become parents. Lord Blackford had been unable to ascertain how many babies had been produced during those years, but he had been told that they "reached three figures." Other doctors had practised privately since, and estimates of the number of children produced ranged from 5000 to 10,000.

Turning to some of the problems the procedure created, Lord Blackford said that, though it might gratify the wishes of the husband and wife, it took no account of its effect on the family and the child. He thought that A.I.D. should be discouraged, and he used the word advisedly, because he realised that A.I.D. had come to stay and that we must adjust ourselves to its difficulties and perplexities. He was certainly against making it a criminal offence. One way of discouraging it would be to insist on the registration of donors. A system of licensing a certain number of practitioners who might carry out the operation would also limit its use.

CRITERIA AND CONSPIRACY

The ARCHBISHOP OF YORK said that, though he held A.I.D. to be thoroughly wrong, he was bound to acknowledge that high motives of doing good to unhappy people were conspicuous among those who practised it, and that doctors wrote with a great sense of responsibility about the conditions in which it was right to undertake the operation. But the fair-sized volume of testimony which had accumulated showed a vast discrepancy as to what the principles of this ethical control were. The tangle of inconsistencies made it impossible to believe that any one agreed theory as to what was the right occasion for granting A.I.D. could control the practice. He himself did not believe that there could ever be a right occasion. He did not think it would be wise to make A.I.D. a criminal offence, but it was urgent to eliminate in the public mind any shred of an idea that A.I.D. could somehow be made to lie within the marriage bond.

LORD DENNING said that some doctors thought that there was no law against this practice; and if it was done openly and without concealment this was true. But if it was accompanied by secrecy and deception, he held that it was a criminal conspiracy. Even if the husband consented, was it not a potential fraud on others? For the child, in his view, was illegitimate. A false statement in the register of births was perjury. He thought there was a double unlawful conspiracy—by the doctor with the wife and by the doctor with the donor. Not only was that so in criminal law, but also it could give rise to damages by any person injured by it. To Lord Denning it seemed that if the practice became widespread it would strike at the stability and security of family life. He would say to the doctors, "Where by your science are you leading us? Seek to relieve suffering by all means, but do not do it by secrecy and deception."

LORD AMULREE thought that the number of A.I.D. births was going to be a tiny drop in a big ocean. He thought the estimates given were on the large side. A doctor who had been using this operation for twenty-five years told him that he had seen 2500 sterile couples of whom only 200 were considered suitable for A.I.D. and the number of successes had been about 100. The work, he thought, should be kept in the hands of doctors who should be able to use certain criteria. The doctor must know the parents well, and be satisfied that the marriage was stable, and that a child was really wanted. As the work had been going on for only twenty-five years it was hard to judge what became of the children; but so far the records showed that they appeared normal and had turned out satisfactorily. Lord Amulree deplored any suggestion that artificial insemination should be made a crime. The one thing to make it safe was that it should be carried out freely by responsible people. To make it subject to rules and regulations would be to drive it underground and have it done by charlatans and quacks. In his speech LORD CHORLEY also took up this point, and said that it would be most unfortunate, for it might lead to the use of inferior donors and poor progeny.

IN WHOSE HANDS?

The BISHOP OF EXETER said that though he had signed the report of the Archbishop's Commission which had recommended that A.I.D. should be made a criminal offence, he would not sign it today. Such a step, he was now convinced, would have the effect of drawing its practice from the responsible hands in which it now rested to totally irresponsible, possibly disreputable hands, as had happened with abortion, and might open the door to a fiendish type of blackmail. Furthermore, if A.I.D. were made a criminal offence it would presumably make the children certainly illegitimate, which would press unfairly on the only really innocent party. In his view it would be better to institute a system of control and regulation by which only a panel of selected doctors should be allowed to practise A.I.D. and that anyone else doing so should be guilty of a criminal offence. The panel of doctors should be empowered to test every donor carefully for suitability; it should give A.I.D. only to married women with the husband's consent; and the fact of the A.I.D. should be registered at Somerset House or on the birth certificate. He was uncertain how far secrecy about the identity of the donor was really necessary; this was a matter for further investigation. Secrecy as to the fact that A.I.D. had been used meant that the whole life of the family was based on a living deception, and it would be better to get rid of it and of the unmistakable element of furtiveness that at present surrounded the whole business. He reiterated that in his view A.I.D. was against the law of God. Wife, donor, consenting husband, and doctor were sinful: only the child was innocent. To those who could not accept that judgment he would say "If you really believe that A.I.D. is right, then do it openly and without shame. Be rid of pretence and deception. Accept the necessity of open registration."

The ARCHBISHOP OF CANTERBURY said that if we went on as we had done for the past nine years, talking occasionally about the subject and doing nothing, by sheer inadvertence and inertia the habit would be established as part of the social life of the country. He wished to make it plain that the Church

9. Grokoest, A. W., Snyder, A. I., Ragan, C. *Bull. rheum. Dis.* 1957, 8.

of England had no objection to artificial insemination with the husband's semen, which they regarded as a method of helping the fulfilment of one of the main purposes of marriage. But the use of donor semen was utterly different; it involved in falsehood and deception the husband, the mother, the donor, and the doctor, who (however highminded he might be) not only connived at a perjured declaration of birth, but also made the supposed father and mother promise to conceal the truth forever from the child and from society. To him it was strange that the medical profession should have been content that some of its members, on their own individual authority, should take the law out of the hands of Church and State—into their own hands. He would suppose that the profession itself would desire authoritative clarification of what may or may not lawfully be done.

He asked the Government to act in this matter without delay. He himself thought that the action should be prevention or registration, but the Government might not wish to go so far. Whatever action was taken, we need not fear that the law would be unworkable. For the medical profession, he was confident, would accept scrupulously as a matter of professional honour what the law decreed. Let this practice, he said, be driven underground, as abortion is, and no responsible doctor would practise it. He would expect the medical profession to welcome a step that would relieve them of a spiritual, moral, and social responsibility which did not belong to the medical profession alone. He felt that, though the profession was honoured and respected beyond expression, its members must not (and only a few of them did) arrogate to themselves the right to settle a matter of such profound spiritual and moral significance.

VISCOUNT KILMUIR, the Lord Chancellor, said that it was reasonable to suppose that more information about the practice of insemination was now available than in 1948 when the Archbishop's Commission reported. Yet the debate had shown that a great deal about the practice and its effects was still largely unknown except to the few who were closely associated with it. Great care must be taken before making a law creating a fresh criminal offence or before adopting the principle of registration. In the Government's view the factual information which we had was insufficient and in view of the difficult problems and the acute differences of opinion to which the practice gave rise, they had decided to set up a small interdepartmental committee to inquire into it and make recommendations.

N.H.S. Contribution

Mr. J. E. S. SIMON, financial secretary to the Treasury, on Feb. 25 moved a resolution in the Committee of Ways and Means to increase the rates of contributions to the National Health Service in accordance with the announcement made by the Chancellor.[1] He pointed out that since last year the health service contribution, unlike the National Insurance contribution, had not ranked as a deduction from income assessable to tax; the increase would therefore fall equally on those who paid tax and those who did not. He agreed that it was inherent in any system of flat-rate contributions that they fell most heavily on the lower-paid worker. But the increase of 6*d.* a week for an employed man, for instance, must be viewed against average weekly earnings of £12 11*s.* 7*d.* The increase in the contribution since 1948 was 1*s.* 2*d.* while the increase in average earnings was £5 10*s.* We must, he added, count not only the cost but also the benefits, and he asked members to look at the difference in the service since its start: 27% more patients were being treated than in 1949; waiting-lists had been reduced; 6% more beds were available; hospital services had been improved; more research was undertaken; and more and better drugs were available. The benefit of all this improved medical care to the citizen could be measured, among other things, by the years added to his life, reduced infant mortality, and the startling fall in the incidence of tuberculosis.

Other members were less reassuring about the weight of the burden which the new contributions would throw on the lower-paid workers. Miss MARGARET HERBISON pointed out that average wages did not mean a thing to a railway worker with a basic wage of £7 7*s.* a week, an agricultural worker with a wage of £7 10*s.*, or a woman in the retail food trade with a wage of £4 17*s.* 6*d.* With the new increase these people would have to pay out 6·75%, 6·6%, and 8% of their incomes respectively.

The general feeling that the flat contribution had now reached its limit led several members to ask for a reconsideration of methods of financing the social services. Mr. WILLIAM SHEPHERD reminded members of the Continental system by which, in France for example, the social services added about 50% to the wages bill and nothing came out of the Exchequer. Mr. R. P. HORNBY pointed out that out of every £1 of Government expenditure for every 2*s.* 1*d.* spent on health only 1*s.* 8*d.* went on education. The existing proportions were not necessarily the right ones. Increased contributions were better than increased charges or a reduction in services, but he thought that the time had come to study the whole question of social service payments including sliding scales of contributions.

Mr. ARTHUR BLENKINSOP wondered why the Government had decided to raise an extra £24 million. On their own figures it seemed that the sum required was £9 million rather than £24 million. He also wondered what was the right method of raising funds. This increase could not be considered in isolation, for there had been three increases in the weekly contribution within the past nine months. He thought that we had gone far beyond reasonable bounds in using the flat-rate method.

Mr. DEREK WALKER-SMITH, the Minister of Health, said that the estimated gross cost for the N.H.S. for 1958–59 of £740 million was £31 million more than the estimated out-turn for the current financial year; but it had been reached only by the most vigorous pruning. The contributor in this country was getting a better bargain than the citizens of other countries and better than he could have expected in the early days of the service. He could, surely, not unfairly be asked to pay a little more.

Fees for Cremation Certificates

On Feb. 26 in an adjournment debate Mr. DENNIS HOWELL raised the question of the charges made by doctors in the National Health Service for the second medical certificate which is required before a body can be cremated. Some doctors, he understood, would sign a certificate without a fee, some charged the two guineas recommended by the British Medical Association, others as much as four or six guineas. Why, he asked, should there be any charge when these people were full-time employees of the health service?

Mr. RICHARD THOMPSON, parliamentary secretary to the Ministry of Health, said that in 1949 it had been agreed between the medical profession and the health departments that though whole-time hospital doctors were debarred from private practice they might undertake for a fee some tasks not strictly within the scope of the hospital service, such as medical examinations not in the course of treatment for some purpose such as insurance or emigration. The second certificate for cremation fell into this category. The attention of the Royal Commission on Remuneration had been drawn to the fact that whole-time as well as part-time specialists may receive payment for services outside the scope of the N.H.S.

As these fees were outside the N.H.S., the Minister of Health had no jurisdiction over them. The Home Secretary had powers under the Cremation Act to regulate them, but so far he had not found it necessary to exercise his powers.

Children With Ventricular Septal Defects

Mrs. JOYCE BUTLER, on the adjournment on Feb. 28, asked what facilities there were for treating children with this disability in this country. She gave particulars of six cases where the parents had found it difficult or impossible to arrange for their children to be treated in this country.

Mr. THOMPSON said that in some operations on the open heart hypothermia had proved so successful that it seemed unlikely that the lung-heart machine would continue to be used save in special cases such as these. It was, however, available at

1. See *Lancet*, Feb. 22, 1958, p. 419.

13 centres though the operation for interventricular septal defect had so far only been performed at 4 of them—Guy's Hospital, Westminster Hospital, Bristol Royal Infirmary, and the Royal Liverpool Children's Hospital. The number of operations which had been carried out was not known, but it was certainly small, since the technique of the artificial circulation was new and there had been little opportunity for the teams to acquire experience in its use because so many patients here were treated by hypothermia. Much greater experience had been acquired in the United States, where the heart-lung machine was more widely used, often in operations for which hypothermia would be chosen in this country. But he would not take the view that we were unable with our facilities to do here what was done in the United States. In some cases an operation could not be justified and there was a real risk of the children making fruitless journeys abroad. The final decision in any individual case must be for the doctor.

The Law and Suicide

Members of all parties have signed the motion, tabled in the Commons on Feb. 27 by Mr. Kenneth Robinson, that

"this House is of the opinion that the present law of England relating to suicide has no deterrent effect, is capricious in its incidence, and can no longer be regarded as reflecting the attitude of society; and considers that suicide and attempted suicide should be removed from the category of criminal offences."

QUESTION TIME

Senior Registrars

MR. KENNETH ROBINSON asked the Minister of Health if he would make a statement on the decisions reached at the meeting of the Joint Consultants Committee held on Feb. 27 to discuss the senior registrar problem. Mr. D. WALKER-SMITH replied: After a further discussion with officials, the representatives of the Joint Committee expressed a desire to discuss the subject with me. I have intimated my readiness to meet them at an early date. Mr. ROBINSON: Can the member say for how long this matter, which was urgent two and a half years ago, is going to drag on? How is it that this committee managed to complicate what is essentially quite a simple problem? Who are the stumbling-blocks to a solution—his department or the consultants? Mr. WALKER-SMITH: I am anxious to get an appropriate solution of this problem, the urgency of which I have already recognised in this House, by general agreement if at all possible; but an appropriate solution I must have in any event, and I have no doubt that the committee will take note of the interest of hon. members on this subject.

Mr. J. D. CRONIN: Is it not the case that this meeting on Feb. 27 reached a deadlock because the Minister wanted to make the setting up of the sub-consultant grade a condition for relieving the distress of the registrars?—Mr. WALKER-SMITH: No, I do not think that that represents a full or faithful précis of the committee's decision. I am looking forward to seeing the committee myself and discussing the problem with it. I hope the hon. gentleman does not dissent from what I apprehend is the general view of hon. members, that there ought to be a solution to this problem, and pretty quickly, too.

Admissions to Mental Hospitals

Dr. DONALD JOHNSON asked the Minister whether he was aware that the summary reception order providing for the certification of a person as of unsound mind and for the compulsory removal of that person to a mental hospital, which is in use under the provisions of the Lunacy Act, 1890, as amended, was of identical nature to that first used in the year 1853; and whether, in the light of the advances of medical science since that date, he would introduce regulations to alter this without delay. Mr. WALKER-SMITH: I am considering the Royal Commission's recommendations for new procedures, which would require legislation.

Mrs. BRADDOCK: While waiting to implement the recommendations of the Royal Commission, would not the Minister consider the possibility of proceeding in the first instance under the provisions of section 20 of the appropriate Act instead of section 16? Is he aware that that could be done without any new legislation and that the use of section 20, which puts a patient during the first three days into the hands of fully qualified psychiatrists in the observation unit, would in many cases meet criticisms about admissions at present made under section 16?—Mr. WALKER-SMITH: I will examine carefully the suggestion.

Certification of Mental Defectives

Mr. NORMAN DODDS asked the Minister of Health if he was aware of the concern arising from the fact that there were 4455 mental defectives detained in mental-deficiency hospitals who were certified on the ground of being found neglected, when they were at the time and had been for some time previously in the care of homes of local authorities or an approved charitable organisation; and how many had been certified in this way during the years 1956 and 1957, respectively.—Mr. DEREK WALKER-SMITH replied: All these cases have been reviewed. The answer to the second part of the question is: None, since March 9, 1956, the date of the High Court judgment in Regina *v.* Board of Control ex parte Rutty.

Mr. DODDS: Is it not a fact that when these people get too old to remain in those homes we have been using the expedient of certifying them and sending them to mental institutions, because we have not provided more suitable places?—Mr. WALKER-SMITH: The Board of Control was following what had been the accepted practice until the judgment in the Rutty case. Its difficulty now is that people cannot be discharged until there is somewhere appropriate for them to be discharged to. Mr. ARTHUR BLENKINSOP: Does not this information reinforce our demand that the Government should make up their mind about further financial assistance to enable local authorities to provide more accommodation in cases such as these?—Mr. WALKER-SMITH: It is a relevant factor in the determination of what should be done in the way of local authority accommodation, though there are other factors which also have to be taken into account.

Whitley Again

Mr. KENNETH ROBINSON asked the Minister whether he had now instructed his representatives on the Whitley Council which is considering the radiographers' salary claim.—Mr. WALKER-SMITH: I have informed both sides of the Whitley Council that, in present economic circumstances, the Secretary of State for Scotland and I could not agree to a pay award being made in response to this claim. Mr. ROBINSON: Is this not a further outrageous interference with the working of Whitley Council machinery?—Mr. WALKER-SMITH: On a previous occasion criticism was made that the Secretary of State and I did not give sufficient indication of the way in which our minds were working in regard to the exercise of our statutory duty. In this case, we have given notice so that both sides of the Whitley Council are aware of the position. Mr. ROBINSON: Is the Minister in fact saying that now every Whitley Council has got to reach disagreement before there can be even the possibility of a pay increase? Is that what this decision means?—Mr. WALKER-SMITH: No, Sir. I am saying that these questions have got to be looked at on their merits in the context of the general economic position of the country.

Medicine and Television

Sir IAN CLARK HUTCHISON asked the Postmaster-General whether he was aware that many doctors believe that the television programme, *Your Life in Their Hands*, will have a bad effect on viewers; and if he would use his powers under section 15 (4) of the Licence and Agreement to instruct the British Broadcasting Corporation to refrain from showing this type of programme.—Mr. A. E. MARPLES: I am aware that opinions differ about the merits of these programmes, but I see no reason to interfere with the independence of the B.B.C. in making programmes.

Sir I. CLARK HUTCHISON: Does not the Minister think that this is rather a morbid type of programme? Will he consult representatives of medical opinion and consider this again?—Mr. MARPLES: I must emphasise that the B.B.C. is responsible for the programme, and not the Postmaster-General. As to

consulting medical opinion, before the programme the B.B.C. consulted the Royal College of Surgeons, the Royal College of Physicians, and the College of General Practitioners. After the programme, those three colleges said that they appreciated the programme.

Sir HUGH LINSTEAD: Does the Minister agree that the reaction from the public, as received by the B.B.C., has been almost entirely favourable to this programme?—Mr. MARPLES: As far as I understand, there had been, up to Feb. 20, very little reaction in the form of letters. There were 25 letters approving and encouraging the programme, 6 suggesting additions to the service, and, I think, 7 suggesting that the programme is unsuitable.

The House returned to this subject on Feb. 27 when Dr. EDITH SUMMERSKILL raised it on the adjournment. She contended that to have an interest in disease was not healthy unless one was a public-health worker. A lay person had only a morbid interest in disease which these television films were fostering. She accepted that intelligent men and women had looked at these films and said: "How very interesting. Yes, these should be very interesting to the viewing public." But a surgeon or physician interested in his own technique probably did not think how the films might hurt those who were not so intelligent or well-informed, and the fact was that T.V. today was viewed by a vast number of emotionally unstable people who identified themselves closely with the proceedings.

Mr. KENNETH THOMPSON, the Assistant Postmaster-General, admitted that the programmes were controversial, but he had more confidence than Dr. Summerskill in the capacity of his fellow citizens to judge for themselves and to arrange their conduct in the light of that judgment. It was true that for its own reasons the B.B.C. did not consult the British Medical Association, but the Minister was not called on to express an opinion on the rights and wrongs of that. In these things the B.B.C. must have complete freedom. Supposing the B.B.C. had consulted the B.M.A., and the B.M.A. had expressed the opinion which now appeared in the *British Medical Journal*, was the B.B.C. then to allow the B.M.A. to have the power of veto over its proposals? This would surely place both bodies in an impossible position.

His personal opinion, in which the Minister concurred, was that the programmes would do good rather than harm. Some neurotics and hypochondriacs might react badly, but that applied also to other films and presentations on the B.B.C. If one person was advised by these programmes to seek an early opinion and if one life was saved or one illness shortened, the B.B.C. could claim that it had been instrumental in putting understanding in place of fear, information in place of mystery, and guidance where there was only doubt.

N.H.S. Visits

Under the National Health Service the average number of visits per patient is about 3 by the patient to the doctor and about 2 by the doctor to the patient.

Medicine and the Law

Personality Change after Operation

A FORMER teacher was charged with fraudulent conversion, and it was claimed that after an operation two years previously his personality had changed completely—from companionable to morose, according to his wife.[1] A psychiatrist gave evidence that after the operation there was a complication that resulted in damage to the brain through lack of oxygen. This damage caused a personality change, which might result in his losing his sense of responsibility and his memory for recent events. The defendant was put on probation for three years on condition that he underwent a course of psychiatric treatment.

1. *Times*, Feb. 26, 1958.

Obituary

JOSEPH GODWIN GREENFIELD

M.D., B.Sc., LL.D. Edin., F.R.C.P.

SINCE his retirement in 1949 from the post of pathologist to the National Hospital, Queen Square, Dr. Greenfield had worked from time to time in the United States; and it was at Bethesda, Maryland, that he died last Saturday at the age of 73.

His father was W. S. Greenfield, F.R.C.P., professor of pathology and clinical medicine at Edinburgh, and he was educated at Merchiston and Edinburgh University. Qualifying in 1908, he was house-physician at Queen Square for a year or two before he went to the General Infirmary at Leeds as assistant pathologist in 1912. In 1914 he returned to the National Hospital as pathologist; but he held a commission in the R.A.M.C. until 1919. In that year he was writing with Farquhar Buzzard on encephalitis lethargica, and in 1921 they collaborated in their *Pathology of the Nervous System*. He was making, and continued to make, fine use of his exceptional opportunities for working both individually and with clinicians; and among his later studies were contributions made with W. J. Adie, James Taylor, Purdon Martin, and E. A. Carmichael, and with American associates.

As a teacher Greenfield exerted much influence through his books but even more through his daily contacts, alike with juniors and with coevals; for his qualities as a person matched his abilities as investigator and pathologist. Some of these qualities and abilities are brought out by the following tributes from two of his friends.

* * *

The sudden and unexpected death of Godwin Greenfield, in what seemed a singularly youthful and robust old age, marks far more for his friends and colleagues than the passing of a great figure in the world of neuropathology. Not soon shall we see again a man in whom were so happily blended so many qualities: a lightly-worn but immense erudition in his subject, a record of major contribution to it, a generosity unsurpassed in the giving of the fruits of his experience to other workers, a complete unselfishness, with a modesty and equanimity and an integrity that made it not possible for him to have an enemy, and that gained for him a widespread personal affection and respect. A more rounded and complete personality it would have been hard to find, and those who enjoyed the privilege of his friendship, as colleagues or as pupils, will not forget him. Good nature he had in abundance, but no gifts of eloquence, and it was in personal conversation and teaching that he made his greatest impact upon his pupils and upon all who sought his advice or help.

My own valued friendship with Greenfield began in 1912 when we were both in residence in the National Hospital, Queen Square. From this hospital he moved to Leeds to learn the discipline of pathology, that he was to follow, from that great teacher, Matthew Stewart, professor of pathology at Leeds. The first war ended, Greenfield returned as its first whole-time pathologist to Queen Square, and there with limited resources, and with still narrower material reward, he began that unbroken course of original contributions to neuropathology upon which he was still engaged up to the time of his death. These contributions appeared in *Brain* and other

journals over the years, and there are few pathological processes within the nervous system that have not been studied and illuminated by him. Even to enumerate all the special problems which have occupied him would be beyond the scope of this notice. Yet there should be mentioned his textbook (with Buzzard) of neuropathology, his monograph (with Arnold Carmichael) upon the cerebrospinal fluid, his recent work on the pathology of muscle (with American colleagues), and an as yet unpublished work on neuropathology.

In addition to all this he bore the burden for many years of all the routine morbid-anatomical and clinical pathological work of the hospital, and the training of a sequence of young men in the methods of morbid histology and anatomy of the nervous system.

In the United States his reputation stood particularly high, and after his retirement on reaching the age-limit in this country, he was eagerly invited to continue his work in the National Institute of Neurological Diseases and Blindness at Bethesda, Maryland. There during three long visits he did some of his best work in a country not his own, where a rational flexibility of administration, and a sound appreciation of his capacity still to add to knowledge, made it possible to find the resources for an emeritus to continue to utilise his gifts in the service of mankind.

Every man who knew him was Greenfield's friend, and he well deserved the esteem in which he was held. Public and academic honours did not come his way, save for the honorary degree which his own university, Edinburgh, conferred upon him in 1956. Yet we should go far to find a man who merited them more. Greenfield was too modest for this world, but he could not but have been aware of the warmth of regard in which he was held by those able to appreciate him and his work, and we may be sure he was well content with what so few of us can hope to deserve or to obtain in such full measure. Not less happy was he in his family, and to Mrs. Greenfield, the gracious partaker of his many virtues, and to his family our deepest sympathy goes out in their loss.

F. M. R. W.

The debt owed by pathologists, and neuropathologists in particular, to Godwin Greenfield is great both in this country and abroad. For over the years his laboratory at Queen Square was frequented by a succession of young people from other countries who came to the National Hospital for neurological training. They received unlimited teaching and advice from a man who had trained himself not only in the techniques for which this centre has been famous but in the interpretation of what is seen under the microscope in terms of observed symptoms and signs during life. The attachments formed between teacher and pupil were such that few can have enjoyed the continued friendship and admiration of so widely dispersed a community throughout the world.

Until about ten years ago the neuropathologists of this country could be numbered on the fingers of one hand. The formation then of a number of new posts for workers in this field led to the recruitment of young people: all eager but with much to learn. Characteristically Greenfield recognised their need; he called a preliminary meeting of those interested, and at Queen Square a "Neuropathological Club" was formed which aimed at providing a forum for the discussion of difficult problems. Soon its membership was extended overseas, where isolated workers in particular were glad to join this new fraternity. There are now 45 home members and 15 from abroad. This club will be a living and lasting memorial to an important side of Greenfield's professional activities.

His enthusiasm was at all times stimulating and infectious, whether he was discussing such obscure topics as carcinomatous neuropathy, or his outside interests and hobbies which were varied. He was a keen gardener, and visitors to his home at Westcott would be taken on tour round his large and beautiful garden. Pausing before various, often rather exotic, trees and shrubs he would enlarge upon the attributes of each silent friend; occasionally perhaps lament its pathology. His appreciation of beauty also found expression in photography, and in recent years visitors to Westcott often had the chance of enjoying projected 'Kodachromes' of his travels: views in which intrinsic merits of colour and form were most memorable.

In research Greenfield's inquiries covered many applications of general and special pathology to the central nervous system, as witnessed by his publications. He was perhaps best known as an authority upon the different forms of encephalomyelitis, but it would be difficult to name any aspect of neuropathology upon which he was silent. It is gratifying to know that much of his knowledge will be crystallised in a volume to be issued within the next few weeks. This and other tangible products of the years of his retirement will be cherished by the many who have enjoyed his comradeship and help, but are left to mourn his departure.

D. S. R.

Dr. WILKIE SCOTT

I. M. L. writes:

I knew Dr. Scott for some years and had the privilege of working with him in Nottingham. I shall always remember him as a kindly, courteous man, humble enough to admit when he was wrong, and generous to his younger colleagues. He had a dry sense of humour, strongly tinged with the background of his native Scotland. The tragic loss of his wife must have been a blow from which he never really recovered.

Dr. ALFRED BENATT

A friend writes:

Benatt received his training and early inspiration in the clinic of a medical genius and humanist—Frederic Kraus in Berlin. It was here that his scientific gifts and leanings were directed to cardiology. He early felt that cardiology should provide the scientific basis for balneology; and his extensive and successful work to that end should be remembered. At the same time he had a deep sense of historical continuity and he looked at some of his problems and subjects in historical perspective. It was in this spirit that he made a scientific pilgrimage to the ancient and highly interesting watering-places of Anatolia and that he was able to illuminate the early history of cardiac catheterisation, reviving the work of the ingenious but forgotten Berlin clinician Bleichroeder. His masterly survey in connection with his own work on tuberculosis in Thailand reflects the vision and insight into human relationships which are taught by medical history.

Intensely keen on refreshing, deepening, and extending his knowledge, Benatt would miss no meeting, demonstration, or discussion, near or far. This in itself showed an essential modesty and readiness to compromise—although at first sight and to some he might have given a different impression. He took a great interest in the progress of those young specialists who, on returning from the war, took up their studies for higher qualifications, and this interest was highly appreciated. He was exceptional in the trouble that he was prepared to take on behalf of his patients and friends.

The work he later did in Italy, Thailand, North Africa, and elsewhere revealed the aptitude, adventurous streak, and quiet heroism of the pioneer.

Births, Marriages, and Deaths

BIRTH

EVANS.—On Feb. 4, at St. Bartholomew's Hospital, E.C.1, to Muriel, wife of Robert J. Evans, M.D.—a son, Miles Liddiard.

HUGHES.—On Feb. 24, to June, wife of Edward Brierley Hughes—a daughter.

DEATHS

HOWAT.—On Feb. 9, in London, Robert King Howat, M.B. Glasg., F.R.C.S., F.R.F.P.S.

Notes and News

A WORKSHOP FOR MENTAL PATIENTS

WE lately referred [1] to the grant of £7500 made by the Nuffield Provincial Hospitals Trust to Cheadle Royal Hospital, towards the running costs for three years of a sheltered workshop. It is hard to fill the time of long-stay patients constructively and therapeutically; and Dr. W. V. Wadsworth, medical superintendent of Cheadle Royal, felt that work in hospital departments or gardens was unsatisfactory, because patients were rarely made to feel valuable or responsible. Whether the work was well or ill done made little difference, and enthusiasm was seldom generated. Moreover, the rewards were unrelated to the work done. As part of a general modernisation of the hospital and an "open doors" policy, a new occupational centre was built,[2] but the tempo of work done there was slow and unsteady; and the handicrafts practised seemed inadequate to sustain interest. Something closer to an ordinary factory was needed.

After visiting mental hospitals in Holland and certain industrial concerns, Dr. Wadsworth decided to incorporate two new principles into the proposed hospital industrial unit: healthy people from outside should be employed alongside the patients; and the product should be marketed by the hospital and the receipts devoted to paying the patients and supporting research connected with the workshop. The healthy workers would make it possible to cope with fluctuations in demand, yet leave an uninterrupted flow of work for the patients.

It is intended that the workshop, which was conceived as part of the treatment offered by the hospital, will be so sheltered that the tempo of work can be adapted to clinical indications and the changing pressure in demand buffered. It will help to instil an increasing sense of independence, which will later be encouraged by the establishment of a hostel, and perhaps by work outside the hospital. The products of the workshop will be paper novelties and decorations, which are in demand not only at Christmas but also in the summer—in holiday camps, for example. The profit is expected to be enough to pay slow workers a worth-while wage, to make the workshop self-supporting in three years, and to assist in the maintenance of the proposed hostel.

Although it is hoped to avoid a "research atmosphere", some investigations are planned as a by-product of the work of the shop. For example, the effects on patients of the proximity of healthy workers, of varying degrees of strictness in supervision, and of pay differentials and target schemes; the effects on production of the visual and auditory environment and of clinical conditions; and the clinical effects on patients of doing such work, could all be investigated in controlled schemes.

The grant will pay the salaries of an industrial psychologist in charge of the investigations and of an industrial manager, and leave a margin for equipment.

SCIENCE AND POLITICS

IN his Bernard Dyer lecture to the Society for Analytical Chemistry, Sir Hugh Linstead, M.P., secretary to the Pharmaceutical Society, spoke of the political responsibilities of scientists. They must not only discover new things but interpret them—both to the politicians, who had the duty of applying scientific discoveries to daily affairs, and to the man in the street, by whose consent the politician governs. The public are eager to learn, but are often disappointed because science has given them so many miracles that they have become insatiable and will not believe that no answer can be given to some questions. The meaning of the discoveries must be explained in the passionate images that alone will hold attention. but illuminated only by the cold objective light of scientific truth.

But the scientist, Sir Hugh continued, should preserve his independence by holding aloof, like a public servant, from all political parties. He cited Lord Halsbury as acknowledging that this was no negligible request to make of scientists, many of whom held strong and sincere political views; but he believed that the things lost were more than compensated for by the contribution they made to the moral store of humanity.

Sir Hugh said that Julien Benda, in *La Trahison des Clercs*, has accused the scientist along with other intellectuals, and asserted that certain fundamental standards and truths (such as the objectivity of science) are at present in danger, and that the intellectual's duty is to protect these at all costs. This entailed his keeping himself clear of the compromises and temptations of politics. The intellectual himself might be crucified, said Benda, but his words would haunt the memory of men till they prevailed.

NATIONAL CORPORATION FOR THE CARE OF OLD PEOPLE

THERE is something about round figures which prompts us all to self-examination, and the tenth annual report [1] of the Corporation shows how useful decennial reflection can be. Since it was started in 1947 it has distributed over £1,200,000 for work among old people. Much of the money has gone as grants-in-aid to voluntary organisations; for the governors believe that it is their job to help voluntary bodies to experiment with small informal pilot schemes, some of which, when proved and tried, will take their place on the more formal pattern of statutory provisions. Housing, chiropody services, domiciliary care have all claimed the Corporation's interest and generous support in the past; in the future the governors probably will not have so much money to spend and will have to be more selective though no less willing to help. Their work among so many voluntary and statutory organisations in all parts of the country has suggested to them that there is need for a central information exchange. Many useful local schemes are started without the knowledge that elsewhere similar schemes are being tried which could offer advice based on early experience; valuable surveys are undertaken and the information collected receives only local publicity. The Corporation therefore propose to compile and maintain a record of what is being done for old people all over the United Kingdom, and later perhaps abroad, and to carry out inquiries and research projects.

In their report last year [2] the Corporation gave some figures which suggested that it was not necessarily cheaper for old people to remain at home with the support of domiciliary services. This year they give some more budgets, but the evidence still seems inconclusive and clearly much more information is needed. Perhaps the new clearing-house could collect it.

MEDICAL SPECIALISATION AND THE LAW

THE increase in the number both of specialists (who may outnumber the general practitioners) and of specialties (up to fifty are recognised in some countries) reflects increasing medical sophistication. Protection of the public against the unqualified setting up as specialists is usually in the hands of the profession, who set up standards and prescribe suitable training and qualifications; but the tendency is increasing for control by legislation, and the present position is surveyed in a W.H.O. pamphlet.[3] An account is given of the laws in the 23 countries where specialisation is controlled by law, including definitions (or lack of them), periods of training, examinations, and registration.

Expansion of School Health Service in Birmingham

Birmingham Education Committee has approved a resolution to make the city's school health services available to children attending private schools in Birmingham.

1. See *Lancet*, Feb. 22, 1958, p. 422.
2. *ibid.* 1957, ii, 33.

1. The National Corporation for the Care of Old People, Nuffield Lodge, Regent's Park, London, N.W.1. 10th annual report of the Board of Governors for the year ended Sept. 30, 1957.
2. See *Lancet*, 1957, i, 465.
3. Medical Specialisation: a Survey of Existing Legislation. World Health Organisation, Geneva, 1958. Pp. 39. 1s. 9d. Obtainable from H.M. Stationery Office, P.O. Box 569, London, S.E.1.

University of Cambridge

On Feb. 22 the following degrees were conferred:

M.D.—R. W. Ross Russell.
Sc.D.—Hermann Lehmann.
M.B.—R. A. S. Gilchrist, E. W. R. Oakden (by proxy).

University of London

On Jan. 1 the following degrees were conferred:

D.Sc.—W. R. S. Doll.
Ph.D.—B. K. Acharya.

University of Sheffield

Prof. W. Hobson has resigned from the chair of social and industrial medicine on his appointment as medical officer in training and education in the World Health Organisation regional office at Copenhagen. Dr. F. I. N. Dunsford has been appointed part-time honorary lecturer in blood-group genetics.

University of Cape Town

Dr. J. E. Kench, senior lecturer in chemical pathology in the University of Manchester, has been appointed to the chair of chemical pathology on the joint medical staff at Cape Town University.

Harveian Society

On Wednesday, March 19, at 11, Chandos Street, London, W.1, at 8.15 P.M. Prof. Robert Kark will give the Harveian lecture. To mark the centenary of Richard Bright's death he has chosen as his subject Bright's Disease, Then and Now.

International Congress of Paediatrics

This congress will be held in Montreal from July 19 to 25, 1959. Further details may be had from the secretary-general, P.O. Box 215, Westmount, Montreal, Canada.

International Congress of History of Medicine

This congress will take place in Montpellier from Sept. 22 to 28. Further particulars may be had from the secretary-general of the congress, Faculté de Médecine, Montpellier, France.

Euthanasia Society

On Thursday, March 13, at 7.30 P.M., at Friends' Meeting House, Euston Road, London, N.W.1, Dr. Eliot Slater will speak on the biologist and the fear of death.

Royal Society of Health

On Monday, March 10, at 2.30 P.M., in the Caxton Hall, Westminster, S.W.1, this society will hold a meeting on nuclear radiation hazards. The speakers will include Sir Ernest Rock Carling and Dr. W. H. P. Minto.

Ernest and Minnie Dawson Cancer Trust

The trustees have awarded the following prizes for 1956: £1000 to Dr. J. J. Coghlan and £500 to Dr. E. C. Atkinson. The competition was open to general practitioners in Lancashire or Yorkshire for a thesis on cancer. The closing date for the next competition is May 1, 1959. Further particulars can be had from the clerk of the trust, 89a, Fishergate Hill, Preston, Lancs.

Association of Surgeons of Great Britain and Ireland

The annual meeting of this association will be held from April 10 to 12 in the Institute of Clinical Science, Grosvenor Road, Belfast. The programme will include short papers on liver surgery, and Sir John Cockcroft will give the Mitchell lecture on radioactive isotopes. Tickets may be had, not later than March 29, from the secretary of the association, 47, Lincoln's Inn Fields, London, W.C.2.

Royal Commission on Remuneration

The Royal Commission on Doctors' and Dentists' Remuneration will hold public hearings at the North British Hotel, Edinburgh, next week. On Thursday, March 13, representatives of the Royal Faculty of Physicians and Surgeons of Glasgow have been invited to attend at 2.45 P.M., and on Friday, March 14, representatives of the Royal College of Surgeons of Edinburgh at 10.30 A.M. and of the Royal College of Physicians of Edinburgh at 2.30 P.M.

Royal College of Surgeons of England

The Lister festival dinner, which takes place triennially, will be held at the college on Friday, March 28, at 7.45 P.M. Fellows may apply for tickets (50*s*.) to Mr. W. F. Davis, deputy secretary of the college, Lincoln's Inn Fields, London, W.C.2.

Royal Society of Arts

On Wednesday, March 12, at 2.30 P.M., at the society, John Adam Street, London, W.C.2, Mr. N. W. Pirie will give the E. Frankland Armstrong lecture on world hunger as a biochemical problem.

World Congress of Prophylactic Medicine and Social Hygiene

This congress will be held at Merano, Italy, from Oct. 18 to 23. Further particulars may be had from the general secretary, VIII, Piaristengasse 41, Vienna, Austria.

Society for Psychosomatic Research

A conference on the nature of stress disorder is being held at the Royal College of Physicians, Pall Mall East, London, S.W.1, from May 2 to 4. A few places are still open, and applications should be sent to the secretary of the society, 130, Harley Street, W.1.

Regrouping of Water Undertakings

The Minister of Housing and Local Government is to make an order under which the water-supplies of Herefordshire will be reorganised (*Times*, March 4). A joint board covering nearly all the county will replace a number of existing water authorities. This is the first compulsory order for regrouping water undertakings under the Water Act, 1945.

Fact and Faith Film

Doctors in London were last week invited to see *Red River of Life*, an American film shown by Fact and Faith Films (12, Queen Anne's Gate, S.W.1). It deals in popular terms with the functions of the blood and the mechanisms of the circulation, and suggests that the facts presented are evidence for the existence of a Creator. It is one of a series of films presenting scientific advances from a Christian standpoint.

Contraceptive Technique

A lecture film demonstration for final-year students from London medical schools will be given at University College Hospital Medical School, W.C.1, on Friday, March 14, at 5.30 P.M. Prof. W. C. W. Nixon will be in the chair and Dr. Sylvia Dawkins will speak. Admission by ticket only from the secretary, Family Planning Association, 64, Sloane Street, S.W.1.

Prof. Boris Petrov, Prof. Isaac Zhorov, and Prof. Vladimir Pshenichnikov have arrived from Moscow, at the joint invitation of the Faculty of Anæsthetists of the Royal College of Surgeons of England and of the British Council's Soviet Relations Committee, for a three weeks' visit to study the methods and teaching of anæsthetics here. They will visit hospitals at Oxford, Cardiff, Birmingham, Edinburgh, Newcastle, Liverpool, East Grinstead, and London.

The muscular dystrophy group of the Central Council for the Care of Cripples has collected over £12,000 since it was founded two years ago. Grants for research have already been made to support work in London, Oxford, Edinburgh, Newcastle upon Tyne, and Birmingham. Applications for grants from workers who are studying normal or diseased human muscle should be sent to the group, 34, Eccleston Square, London, S.W.1.

Surgeon Rear-Admiral D. F. Walsh and Surgeon Captain George Phillips, R.N., have been appointed honorary surgeons to the Queen, and Surgeon Captain W. P. E. McIntyre, R.N., an honorary physician.

The late Sir Thomas Dunhill has left an estate in Great Britain valued at £138,163 gross. His bequests include £3000 to St. Bartholomew's Hospital Medical College for the benefit of the surgical professorial unit, £500 to the Royal College of Surgeons of England, and £A500 to the Royal Australasian College of Surgeons.

On Feb. 25 the Liverpool Medical Institution presented Lord Cohen of Birkenhead with his portrait, which has been painted by Mr. Harold Knight, R.A. The presentation was made by Prof. Bryan McFarland.

The Medical Historical Club of Toronto plans to erect a cairn in memory of Sir William Osler at Bond Head, the Canadian village where he was born. Contributions are invited and should be sent to the secretary of the club, Dr. Eric Linell, 253, Blythwood Road, Toronto 12, Ontario.

Dr. Lennox Johnston has been elected president of the National Society of Non-Smokers. He will deliver his inaugural address, entitled Militant Non-Smoking, at Caxton Hall, Westminster, at 8 P.M. on Tuesday, March 11. Doctors are invited to attend.

Dr. John Bowlby has written, for the National Association for Mental Health, a booklet about separation of mother and child, and how it may be avoided or, if unavoidable, accomplished with least harm. (Can I Leave my Baby ? Published by the National Association for Mental Health, 39, Queen Anne Street, London, W.1. Pp. 14. 1*s.* 6*d.*)

A series of 35 mm. filmstrips has been produced by Messrs. Reckitt & Sons, Pharmaceutical Department, Hull. They deal with the care of the premature baby at home, the care of the geriatric patient at home, an emergency obstetric unit, the technique of blood-transfusion, the technique of ward dressing, the Rideal-Walker test, and the Chick-Martin test. Each filmstrip is in colour and contains from 15 to 42 frames; that on blood-transfusion is in 2 parts. A commentary is supplied with each. The cost ranges from 30*s.* to 42*s.*

Appointments

BANNERMAN, HUGH, M.B. Durh., D.O.M.S.: ophthalmologist, Bristol clinical area.
BARCLAY, R. F., M.B. Lond., D.P.H.: M.O.H., Kingswood, Mangotsfield, Sodbury, and Warmley, Gloucestershire.
COULSTING, H. S., M.B. Manc., D.P.M.: consultant psychiatrist (child guidance), Bristol clinical area.
EVERALL, J. D., M.R.C.P.: honorary dermatologist, French Hospital and Dispensary, London.
PATHY, M. S., M.R.C.P.E.: assistant physician (geriatrics) (S.H.M.O.), Amersham General Hospital, High Wycombe, and Aylesbury Hospitals.

Surrey County Council:

BARTLETT, P. A., M.B. Lond.: assistant M.O. (school health, maternity and child welfare).
BATTEY, ALISON M., M.B. Edin., D.P.H. : assistant M.O. (school health, maternity and child welfare).
LILLIOTT, MAIREAD M., M.B. Lond., D.OBST., D.P.H.: assistant M.O. (school health, maternity and child welfare).

Birmingham Regional Hospital Board:

BAKER, H. DE C., M.D. Manc.: part-time consultant pathologist, Dudley and Stourbridge group of hospitals.
CLARK, J. M., M.B. Lond.: part-time S.H.M.O. in venereology, Coventry group of hospitals.
GARRETT, J. V., D.M. Oxon., D.C.P.: consultant pathologist, Birmingham (Selly Oak) group of hospitals.
IRWIN, D. B., M.D. Lond., M.R.C.P.: consultant gerontologist, Shrewsbury group of hospitals.
KELSEY, CHARLES, M.B. Polish Med. Sch., Edin.: senior casualty officer, Coventry group of hospitals.
RILEY, HAROLD, M.B. Leeds, D.O.M.S.: part-time consultant ophthalmologist, Coventry group of hospitals.
SMITH, HELEN E., M.D. Manc., D.P.H., D.P.M.: part-time S.H.M.O. in venereology, Coventry group of hospitals.
WHITE, I. C., M.R.C.S.: assistant psychiatrist (S.H.M.O.), Birmingham (mental A) group of hospitals.
WIGHTMAN, DAVID, M.B. Glasg.: senior casualty officer, Dudley and Stourbridge group of hospitals.

Colonial Appointments:

BALGOBIN, G. L., M.B. Belf., D.P.H.: senior M.O.H., Mauritius.
BLACKMAN, VICTOR, M.B. Lond., D.P.H.: pathologist, Tanganyika.
DIGUES LA TOUCHE, D. M., M.B. Lond., D.P.H.: M.O. (grade B), public health, Trinidad.
DRAPER, C. C., B.M. Oxon., D.T.M. & H., D.P.H.: medical research officer (grade 1), East Africa High Commission.
DUDDS, V. E., M.B.: M.O., Northern Nigeria.
EASBY, F. P. D., M.R.C.S.: M.O. (grade A), Government Hospital, Barbados.
FIELDUS, P. L., M.D. Lond.: M.O., Northern Rhodesia.
GILLIES, M. T., M.B. Cantab., D.T.M. & H.: medical research officer (grade 1) entomologist, Malaria Institute, Tanganyika.
GLYN-EVANS, T., M.B.: M.O., Sarawak.
LORDE, G. M., L.R.C.P.E.: assistant M.O., St. Lucia.
MCCOURT, J. F., M.B. N.U.I., D.P.H.: M.O. (special grade), Kenya.
NICHOLSON, VELTA S., M.R.C.S., D.P.H.: M.O.H., Jamaica.
PATEL, R. C., M.S. Bombay, F.R.C.S.: M.O. surgeon (grade B), health department, Trinidad.
PRINGLE, GORDON, M.B. Durh., D.T.M. & H.: senior medical research officer, East Africa High Commission.
RAW, D. R., M.B. Lpool: M.O., Kenya.
WALLACE, E. H., M.B. Glasg., D.O.: specialist ophthalmologist, Sarawak.

Diary of the Week

MARCH 9 TO 15

Monday, 10th

UNIVERSITY OF LONDON
5.30 P.M. (London Hospital Medical College, Turner Street, E.1.) Prof. W. Wilbrandt (Berne): The Concept of Carrier Transports.
UNIVERSITY COLLEGE, Gower Street, W.C.1
5 P.M. Dr. J. D. Judah: Oxidative Phosphorylation: Historical and Experimental. (First of two lectures.)
POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12
4 P.M. Dr. Paul Fourman: Symptoms of Thirst and Polyuria.

Tuesday, 11th

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.1
5 P.M. Dr. Michael Kremer: Sitting, Standing, and Walking. (First of two Oliver-Sharpey lectures.)
UNIVERSITY OF LONDON
5.30 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.) Prof. H. Hamperl (Bonn): Problems of Pneumocystis-pneumonia and Interstitial Pneumonia.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5.30 P.M. *Experimental Medicine and Therapeutics.* Prof. J. V. Dacie: Acquired Hæmolytic Anæmia. (Presidential address.)
8 P.M. *Ptychiatry.* Dr. Felix Post, Mrs. I. Linker : Prognosis of Old-age Depression.
ST. MARY'S HOSPITAL MEDICAL SCHOOL, W.2
5 P.M. Mr. Aleck Bourne: Postmenopausal Hæmorrhage.
INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Mr. A. K. Monro: Venous Leg Ulcers.
INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
5.30 P.M. Prof. F. C. Ormerod: Development of the Internal Ear.
BIRMINGHAM MEDICAL INSTITUTE, Highfield Road, Edgbaston
8 P.M. *Psychiatry.* Dr. S. H. Foulkes: Group Psychotherapy.
MANCHESTER MEDICAL SOCIETY
8 P.M. *Surgery.* (Clinical Sciences Building, York Place, Manchester, 13.) Mr. John Hewet: Perinephric Abscess. Mr. G. R. Carr: Carpal Tunnel Syndrome. Mr. Kenneth Bloor: Cervico-thoracic Ganglionectomy.

Wednesday, 12th

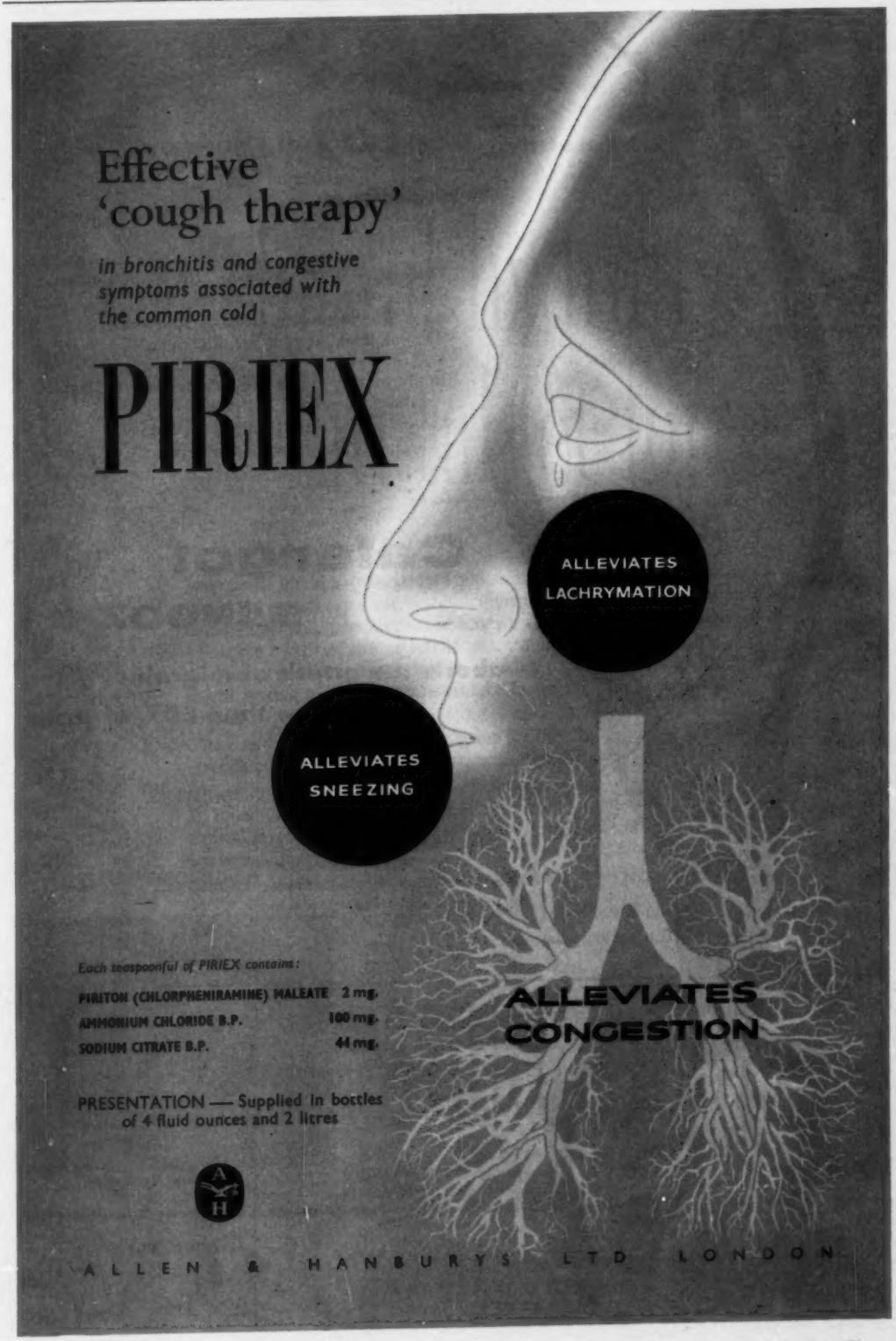
ROYAL SOCIETY OF MEDICINE
4.30 P.M. *Physical Medicine.* Dr. Philippe Bauwens: On the Fringe of Electrodiagnosis. (Samuel Hyde lecture.)
POSTGRADUATE MEDICAL SCHOOL
2 P.M. Dr. J. G. Leopold: Pathology of Bronchitis and Emphysema.
INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. Henry Haber: Squamous Cell Carcinomata and Pre-malignant Conditions.
INSTITUTE OF NEUROLOGY, National Hospital, Queen Square, W.C.1
5.30 P.M. Dr. W. W. Payne: Calcium and Phosphorus Metabolism as Involved in Nervous Disorders.
OXFORD UNIVERSITY
5 P.M. (Radcliffe Infirmary.) Dr. C. W. Taylor: Value and Limitations of Laboratory Investigations in Gynæcology. (Litchfield lecture.)
MANCHESTER MEDICAL SOCIETY
4.30 P.M. *Pathology.* (Medical School.) Dr. A. L. Latner: Intrinsic Factor and Vitamin B_{12} Absorption.
ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 242, St. Vincent Street, Glasgow
5 P.M. Dr. J. A. Simpson: Modern Methods of Electrical Diagnosis in Neurological Disease. (Watson lecture.)

Thursday, 13th

ROYAL COLLEGE OF PHYSICIANS OF LONDON
5 P.M. Dr. Kremer: Sitting, Standing, and Walking. (Second of two Oliver-Sharpey lectures.)
UNIVERSITY OF LONDON
5.30 P.M. (London School of Hygiene and Tropical Medicine.) Prof. Kurt Mothes (Berlin): Physiology of Alkaloids. (First of two lectures.)
ROYAL SOCIETY OF MEDICINE
5 P.M. *Ophthalmology.* Dr. F. O. MacCallum, Mr. B. R. Jones: Virus Diseases of the Cornea.
INSTITUTE OF DERMATOLOGY
5.30 P.M. Mr. Monro : Treatment of Skin Tumours.
ALFRED ADLER MEDICAL SOCIETY AND ADLERIAN SOCIETY OF GREAT BRITAIN
8 P.M. (1, Wimpole Street, W.1.) Dr. R. Dreikurs (Chicago): A New Concept of Man.
LIVERPOOL MEDICAL INSTITUTION, 114, Mount Pleasant, Liverpool, 3
8 P.M. Mr. A. Clifford Brewer: Care of Advanced Carcinoma of the Breast.

Friday, 14th

UNIVERSITY OF LONDON
5.30 P.M. (London School of Hygiene and Tropical Medicine.) Professor Mothes: Biosynthesis of Alkaloids. (Second of two lectures.)
POSTGRADUATE MEDICAL SCHOOL
10 A.M. Mr. B. J. Bickford: Fundamental Considerations of Structure and Function in Thoracic Surgery.
4 P.M. Prof. E. J. Wayne: Treatment of Thyroid Disease and Methods of Assessing Therapeutic Response.
INSTITUTE OF NEUROLOGY
5.30 P.M. Dr. Derek Richter: Biochemical Aspects of Anoxic and Hypoglycæmic States.
INSTITUTE OF LARYNGOLOGY AND OTOLOGY
5.30 P.M. Mr. Maxwell Ellis: General Principles of the Surgical Treatment of Cancer of the Larynx and Hypopharynx.
FELLOWSHIP OF POSTGRADUATE MEDICINE
10 A.M. (Rheumatism Unit, St. Stephen's Hospital, Fulham Road, S.W.10.) Prof. Joseph Trueta: Considerations on Degenerative Arthritis. (Inaugural lecture of weekend course in the rheumatic diseases.)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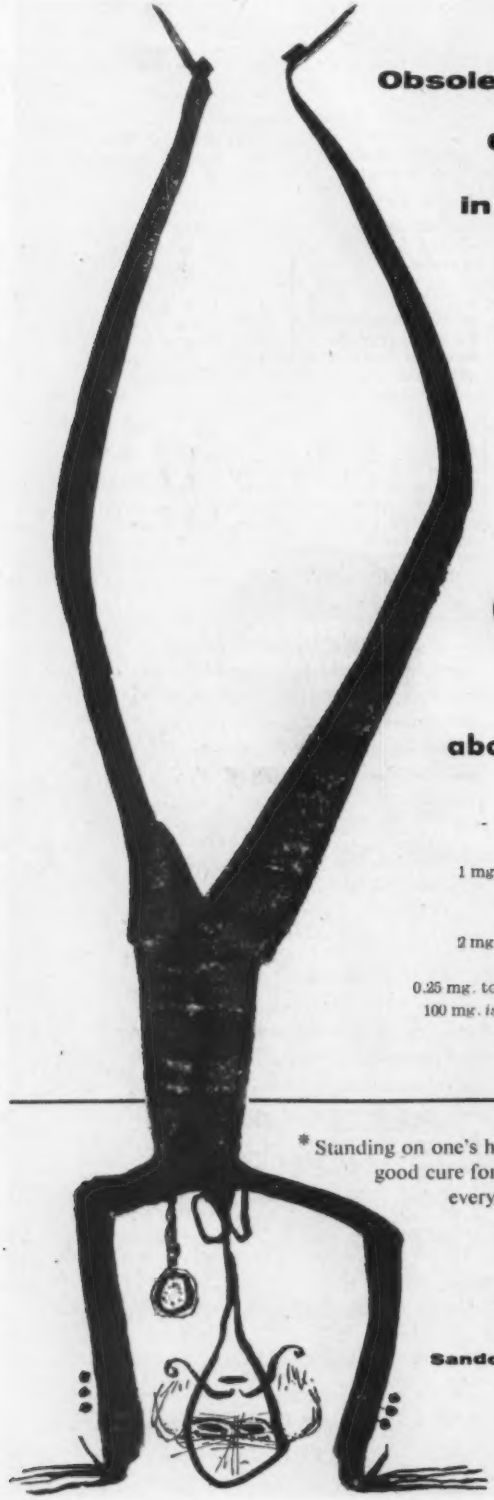

Obsolete

Gravitational Therapy

in Migraine

"You are old, Father William," the young man said,
"And your hair has become very white;
And yet you incessantly stand on your head—
Do you think, at your age, it is right?"

"In my youth," Father William replied to his son,
"I did it to cure the migraine;*
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aborts the attack of migraine in more than 80% of cases

1 mg. Ergotamine Tartrate B.P. 100 mg. Caffeine B.P.	TABLETS
2 mg. Ergotamine Tartrate B.P. 100 mg. Caffeine B.P. 0.25 mg. total alkaloids of belladonna 100 mg. *iso*butylallyl barbituric acid	SUPPOSITORIES

* Standing on one's head is reputed to be a good cure for migraine[1]—but not every patient is so agile.

[1] *Brit. med. J.* (1957) 2, 633

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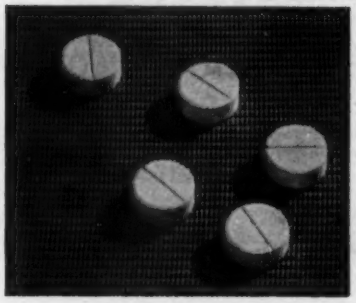

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For **GLUCOSE** _____ **CLINISTIX*** *reagent strips*

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SUGAR _____ **CLINITEST*** *reagent tablets*

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Therapeutische Umschau 1952, 8, 143.

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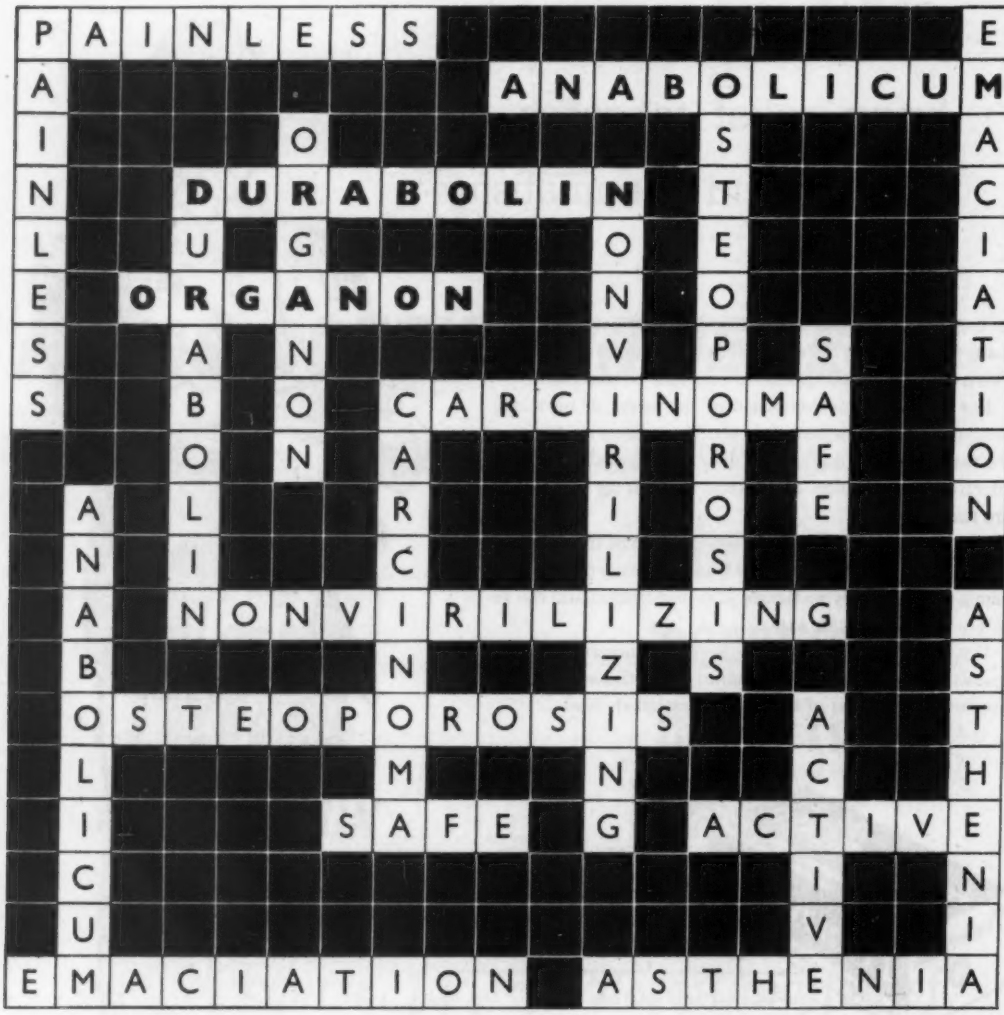

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NULACIN

provides milk-alkali drip therapy without a tube

Maintains continuous control of gastric acidity

Until a few years ago, maintained continuous control of gastric acidity was impossible without hospitalization and discomfort to the patient.

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A Nulacin tablet placed in the mouth between the cheek and the gum dissolves slowly and releases its contained medicaments at a rate that gives continuous neutralization of the acid gastric juice. Nulacin accomplishes this without any danger of causing alkalosis or other side-effects. The results are comparable with those of intragastric milk-alkali drip therapy.

INDICATIONS: NULACIN tablets are indicated whenever neutralization of the acid gastric contents is required: in active and quiescent peptic ulcer, gastritis and other conditions of gastric hyperacidity.

Dosage: Beginning half-an-hour after food, a Nulacin tablet should be placed in the mouth between the cheek and the gum and allowed to dissolve.

During the stage of ulcer activity, up to three tablets an hour may be required. During quiescent periods, for prophylaxis in peptic ulcer and for the relief of discomfort due to gastric hyperacidity, the dose of Nulacin is one or two tablets between meals.

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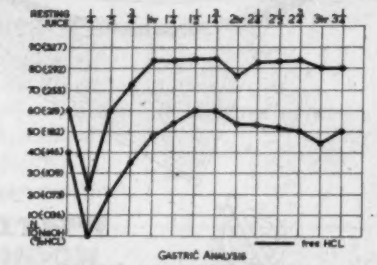
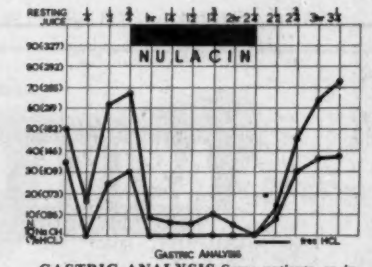
NULACIN tablets are prepared from whole milk combined with dextrins and maltose, and incorporate magnesium trisilicate 3.5 grs.; magnesium oxide 2.0 grs.; calcium carbonate 2.0 grs.; magnesium carbonate 0.5 grs.; Ol. Menth. Pip. q.s.



GASTRIC ANALYSIS

GASTRIC ANALYSIS *Superimposed gruel fractional test-meal curves of five cases of duodenal ulcer.*



GASTRIC ANALYSIS

GASTRIC ANALYSIS *Same patients as in Fig. 1, two days later, showing the striking neutralizing effect of sucking Nulacin tablets (3 an hour). Note the return of acidity when Nulacin is discontinued.*

BIBLIOGRAPHY

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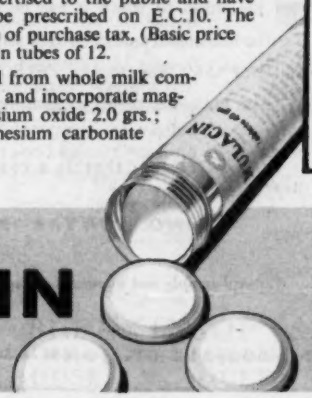
Practitioner, 1956, **176:** 103
Amer. J. Gastro. 1956, **26:** 665
Brit. Med. J. 1954, **1:** 46

Further references to the literature and full information on Nulacin available on request.



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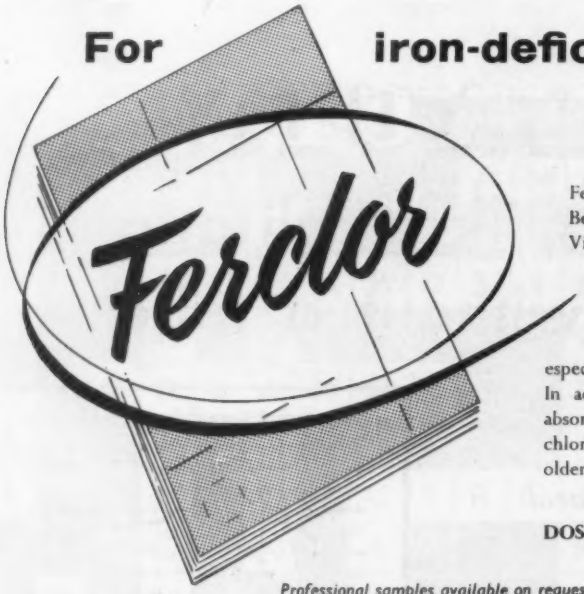

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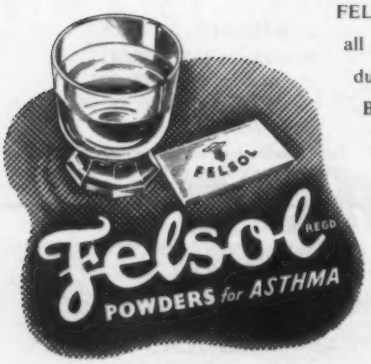

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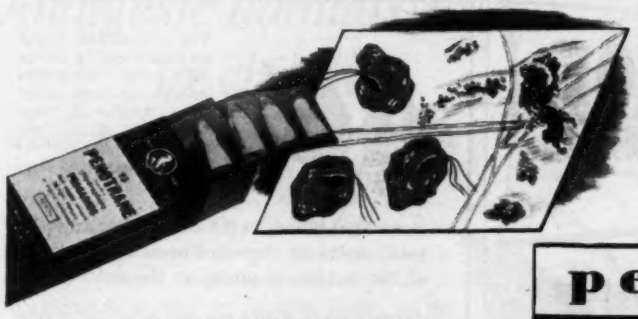

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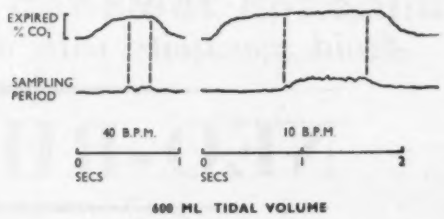

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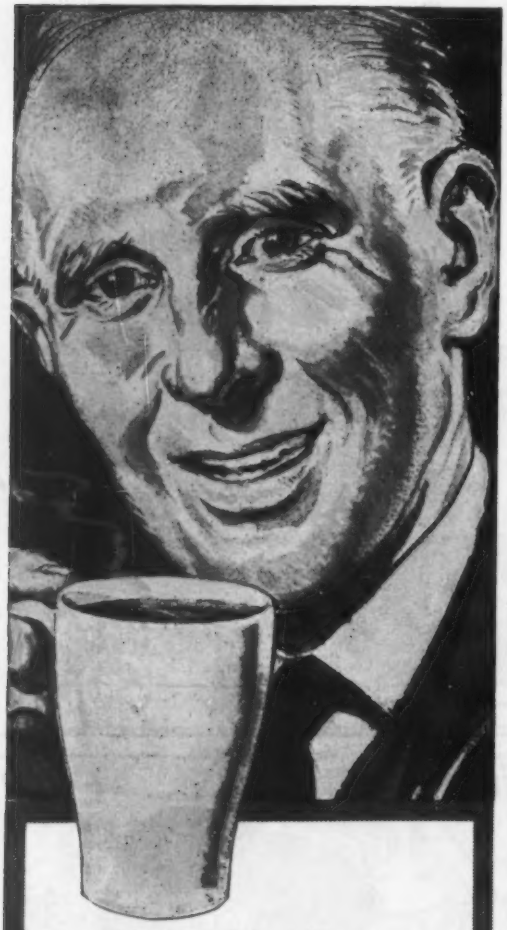

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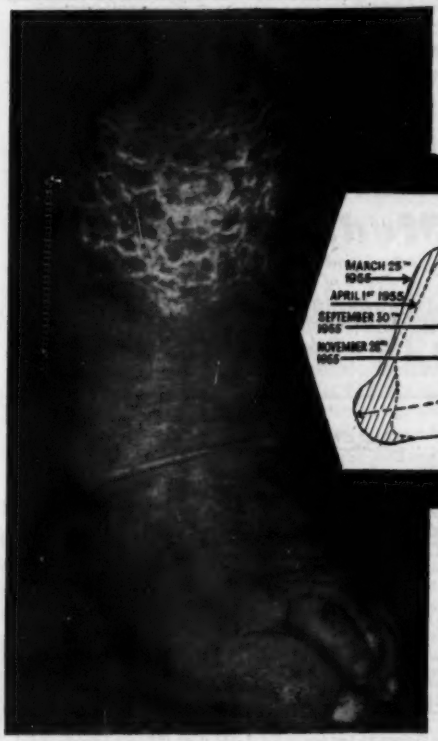

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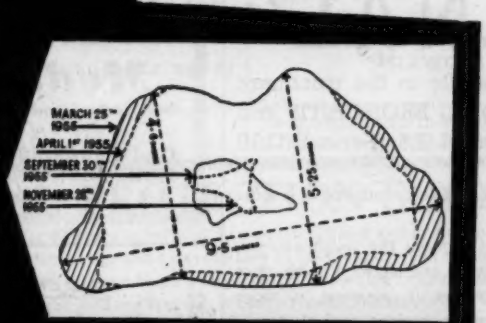

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The Terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N.H.S. hospital posts we advertise, unless otherwise stated. Canvassing disqualifies, but candidates may normally visit the hospital by appointment.

Academic and Educational

FACULTY OF ANÆSTHETISTS
of the
ROYAL COLLEGE OF SURGEONS OF ENGLAND

EXAMINERSHIPS

The Board invite applications for the following Examinerships for submission to the Council of the College:—

FELLOWSHIP IN THE FACULTY OF ANÆSTHETISTS

	No. to be elected
PRIMARY EXAMINATION	
*Anatomy	2
*Physiology	2
*Pathology	2
*Pharmacology	2
FINAL EXAMINATION	
†Medicine	1
‡Anæsthetics	8

*Applicants must hold a medical qualification registrable in this country

†Applicants must hold a higher degree or diploma in Medicine.

‡Applicants must be Fellows in the Faculty.

Forms of application may be obtained from Mr. W. F. Davis, Secretary, Faculty of Anæsthetists, Royal College of Surgeons of England, Lincoln's Inn-fields, London, W.C.2, and must be returned to him by 31st March, 1958.

W. F. Davis, Secretary, Faculty of Anæsthetists.

THE ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE

THE DIPLOMA IN PUBLIC HEALTH
THE DIPLOMA IN INDUSTRIAL HEALTH

The next COURSES OF INSTRUCTION for the above Diplomas will commence on 14TH MARCH, 1958. Tuition may be taken whole-time or part-time.

Prospectuses, enrolment forms and full details may be obtained from the Dean, 23, Queen-square, London, W.C.1.
(TERminus 4788 or 6206.)

UNIVERSITY OF LONDON

A COURSE OF 2 LECTURES entitled (i) "Physiology of Alkaloids"; (ii) "Biosynthesis of Alkaloids" will be delivered by Professor KURT MOTHES (Institut für Kulturpflanzenforschung, Deutsche Akademie der Wissenschaften zu Berlin) at 5.30 P.M. on 13TH and 14TH MARCH at the London School of Hygiene and Tropical Medicine, Keppel-street, Gower-street, W.C.1.

Admission free, without ticket.

JAMES HENDERSON, Academic Registrar.

THE MIDDLESEX HOSPITAL MEDICAL SCHOOL

LEVERHULME RESEARCH SCHOLARSHIP IN CLINICAL MEDICINE

Applications are invited for a Leverhulme Research Scholarship, value £1000 p.a., plus superannuation. The Scholarship shall be for 1 year in the first instance. The scholar must satisfy the Middlesex Hospital Medical School that the major part of his time will be spent in research, but he may be allowed to hold other appointments. The work may be related to any branch of medicine, must be essentially clinical and will be carried out in the Institute of Clinical Research attached to the Middlesex Hospital Medical School.

Applications, with the names of 2 referees, and a summary of the proposed work should reach the Secretary of the Institute of Clinical Research, The Middlesex Hospital Medical School, 40, Hanson-street, London, W.1, not later than 11th May, 1958.

INSTITUTE OF CANCER RESEARCH
ROYAL CANCER HOSPITAL

The Radiotherapy Department of the Royal Marsden Hospital arranges LECTURE DEMONSTRATION COURSES, lasting 1 week, which are open to visitors from Great Britain and abroad.

These courses are held in MAY and NOVEMBER only, and the next course will be held during the week commencing 12TH MAY, 1958.

The course includes the following:—

Radiotherapy for patients with tumours of the larynx and pharynx, bladder, uterus, breast, brain, bronchus, testicle and other sites. Supervoltage teleradium and telecæsium therapy. Radioactive isotope therapy. Clinical investigations with radioactive isotopes.

The fee for the course is £5 5s.

Full details and application forms can be obtained from the Director of Radiotherapy, Royal Marsden Hospital, Fulham-road, London, S.W.3. Applications should be received not later than 30th March, 1958.

THE EUTHANASIA SOCIETY

"The Biologist and the Fear of Death." LECTURE by Dr. ELIOT SLATER, following Annual General Meeting of the Euthanasia Society. Room 15, Friends' Meeting House, Euston-road, N.W.1. 7.30 P.M. THURSDAY, 13TH MARCH.

Admission free. Collection.

"MENTAL HEALTH IN THE PUBLIC HEALTH FIELD"

A COURSE FOR MEDICAL OFFICERS OF HEALTH

The Northern Branch of the National Association for Mental Health, in conjunction with the Extra-Mural Department of the University of Leeds, is holding a residential course for Medical Officers of Health with a view to studying the increased opportunities and responsibilities envisaged in the recent Royal Commission Report. It will be held at Lupton Hall, Leeds, from 11TH to 19TH APRIL, 1958. A few vacancies are still available.

Further information may be had from the Northern Secretary, National Association for Mental Health, 9, Mount Preston, Leeds, 2.

THE INSTITUTE OF LARYNGOLOGY AND OTOLOGY
(UNIVERSITY OF LONDON)
330/332, Gray's Inn-road, London, W.C.1

COURSE ON THE DEAF CHILD for Physicians and Senior Registrars 29TH, 30TH APRIL and 1ST MAY, 1958.

Syllabus obtainable from the Dean.

CONTRACEPTIVE TECHNIQUE

LECTURE FILM DEMONSTRATION for Final Year Medical Students from London Medical Schools, No. 1 Lecture Theatre, University College Hospital Medical School, Friday, 14TH MARCH, 1958, at 5.30 P.M. Chairman: Professor W. C. W. NIXON, F.R.C.S., F.R.C.O.G. Speaker: Mrs. SYLVIA DAWKINS, M.B., B.S.

Admission by ticket only.

Please apply to Family Planning Association, 64, Sloane-street, London, S.W.1.

L.M.S.S.A.

FINAL EXAMINATION: MEDICINE, 14th April, 12th May, 9th June, 1958. SURGERY, 14th April, 12th May, 9th June, 1958. MIDWIFERY, 15th April, 13th May, 10th June, 1958. PATHOLOGY, 15th April, 13th May, 10th June, 1958. MASTERY OF MIDWIFERY, May and November. DIPLOMA in INDUSTRIAL HEALTH, July and December.

For regulations apply REGISTRAR, Apothecaries Hall, Black Friars-lane, London, E.C.4.

UNIVERSITY OF TORONTO
SCHOOL OF HYGIENE

DIPLOMA IN BACTERIOLOGY

A COURSE leading to the Diploma in Bacteriology of the University of Toronto will be offered by the School of Hygiene commencing 12TH SEPTEMBER, 1958. The course will comprise 32 weeks of instruction in systematic and applied bacteriology, systematic and applied virology, public health bacteriology, medical mycology, medical parasitology and statistical methods.

The course is open to graduates in medicine, veterinary medicine, dentistry, pharmacy, agriculture, arts or sciences, who have had at least 1 year of practical postgraduate experience in bacteriology or other laboratory disciplines. The fee is $483.

Since there are limited numbers of places available for this course, early application is advised. Further details on request to Dr. A. J. RHODES, Director, School of Hygiene, University of Toronto, Toronto 5.

UNIVERSITY OF LONDON. The Senate invite applications for the CHAIR OF OBSTETRICS AND GYNÆCOLOGY tenable at Charing Cross Hospital Medical School (salary within the range £2500–£3000 a year).

Applications (10 copies) must be received not later than 14th April, 1958, by the Academic Registrar, University of London, Senate House, W.C.1, from whom further particulars may be obtained.

THE UNIVERSITY OF LEEDS. Applications are invited for IMPERIAL CHEMICAL INDUSTRIES LIMITED RESEARCH FELLOWSHIPS in Bacteriology, Biochemistry, Biomolecular Structure, Botany (Plant Biochemistry and Biophysics), Chemical Engineering, Chemistry, Chemistry of Leather Manufacture, Chemotherapy, Colour Chemistry and Dyeing, Engineering (Civil, Electrical or Mechanical), Fuel and Refractories, Geology (including Geochemistry), Metallurgy, Mining (Selective Flotation and Geophysical Surveying), Pharmacology, Physics, Physiology or Textile Industries (Chemistry of High Polymers (keratin and man-made fibres), Textile Technology and Textile Engineering). The Fellowships will be of an annual value within the range £700–£1000 a year according to qualifications and experience, and will normally be tenable for 3 years. Further particulars can be obtained on request.

Applications (3 copies) (1 in the case of applicants from overseas), together with the names of 2 referees, should reach the Registrar, The University, Leeds, 2, not later than 12th April, 1958.

THE UNIVERSITY OF LEEDS. Department of Pathology. Applications are invited from graduates in medicine or science (if the latter, preferably with a Ph.D. in one of the medical sciences) for appointment to the LYONS FELLOWSHIP FOR MULTIPLE SCLEROSIS AND ALLIED NERVOUS DISEASES of the annual value of £1250 rising by £100 a year; the appointment will be for 1 year in the first instance, renewable for 2 further years. Under the direction of the Professor of Pathology the Fellow will take part in a combined programme of research on the biology of myelin and the experimental pathology of the demyelinating diseases.

Applications (3 copies), stating date of birth, qualifications and experience, together with the names of 3 referees, should reach the Registrar, The University, Leeds, 2 (from whom further particulars may be obtained), not later than 14th April, 1958.

AUSTRALIA. UNIVERSITY OF SYDNEY. Applications are invited for the position of LECTURER/SENIOR LECTURER IN HISTOLOGY AND EMBRYOLOGY. Candidates with a principal interest in morphological, physiological or chemical cytology will be preferred. Salary for a Lecturer is within the range £A1200–80–£A1750 p.a.; for a Senior Lecturer £A1800–70–£A2150 p.a. In each case cost-of-living adjustment will be allowed. The salary is subject to deductions under the State Superannuation Act. (The current scale of salaries is under revision.) The commencing salary will be fixed according to the qualifications and experience of the successful applicant. Under the Staff Members' Housing Scheme in cases approved by the University and its Bankers, married men may be assisted by loans to purchase a house.

Further particulars and information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1. The closing date for the receipt of applications, in Australia and London, is 5th April, 1958.

AUSTRALIA. UNIVERSITY OF SYDNEY. Applications are invited for the position of SENIOR LECTURER IN BACTERIOLOGY. The main teaching duty of the Senior Lecturer will be the instruction of medical and dental students in bacteriology and epidemiology. Salary for a Senior Lecturer is within the range £A1800–70–£A2150 p.a., plus cost-of-living adjustment, and will be subject to deductions under the State Superannuation Act. (The current scale of salaries is under revision.) The commencing salary will be fixed according to the qualifications and experience of the successful applicant. Under the Staff Members' Housing Scheme in cases approved by the University and its Bankers, married men may be assisted by loans to purchase a house.

Further particulars and information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1. The closing date for the receipt of applications, in Australia and London, is 30th April, 1958.

THE UNIVERSITY OF SHEFFIELD. Applications are invited from medically qualified persons for the following posts :—

(*a*) LECTURER IN ANATOMY (1 or 2).

(*b*) DEMONSTRATOR IN ANATOMY (1, 2, or 3).

To begin duties on 1st October, 1958. Salary scales : Lecturer £1200–£100–£1900 ; Demonstrator £900–£50–£1100. Initial salary on either scale according to qualifications and experience. The laboratories are well equipped for histological, histochemical and experimental research.

Further particulars may be obtained from the Registrar to whom applications (4 copies) should be sent by 12th April, 1958.

Hospital Services: Senior Appointments

GUY'S HOSPITAL. The Board of Governors invites applications for the appointment of a PHYSICIAN in Child Psychiatry for 4 sessions per week. The appointment is of Consultant status in the National Health Service and subject to the terms and conditions of service of hospital medical staff.

Applications (1 copy), together with the names of 3 referees, should be lodged with the Superintendent, Guy's Hospital, London Bridge, S.E.1, not later than 22nd March, 1958. In accordance with Statutory Instrument No. 1259 of the National Health Service regulations, canvassing members of the Board or Advisory Appointments Committee will lead to disqualification.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

1. CONSULTANT GYNÆCOLOGIST, 3 half-days a week, Highlands General Hospital, Winchmore Hill, N.21 (732 Beds). Applications before 8th April, 1958.

2. CONSULTANT PATHOLOGIST (Morbid Anatomist), whole-time or maximum sessions, West Middlesex Hospital, Isleworth (1095 Beds). Post vacant July, 1958. Applications before 10th April, 1958.

Hospitals may be visited by direct appointment.

Application forms obtainable from and returnable to Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Part-time CONSULTANT ANÆSTHETIST (2 half-days per week) for the Battersea and Putney Group of hospitals. Duties at Putney Hospital (Monday P.M., general surgery; Tuesday A.M., orthopædics).

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 29th March, 1958. Applicants may visit hospital by local arrangement.

ST. MARY'S HOSPITAL, Paddington, W.2. Applications are invited from practitioners holding a higher medical qualification for the post of CONSULTANT IN CHARGE of the Clinic for Allergic Disorders (Wright Fleming Institute of Microbiology) for 7 notional half-days per week. The successful candidate will be required to have considerable experience in the treatment of allergic disorders and will be expected to take up his duties on 1st July, 1958. He will be required to devote the remainder of his time to research work for which he will be paid by the Wright Fleming Institute.

Applications (12 copies), stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should be sent not later than 26th April, 1958, to the House Governor, St. Mary's Hospital, London, W.2, from whom further information may be obtained.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. DUNDEE ROYAL MENTAL HOSPITAL (GOWRIE HOUSE) and MARYFIELD HOSPITAL, DUNDEE. Applications are invited for a whole-time appointment of PSYCHIATRIST (Consultant) to the Dundee Mental Hospitals. The duties will be primarily in Dundee Royal Mental Hospital (100 Beds for acute mental illness) and in the Psychiatric Ward and Outpatient Clinic at Maryfield (general and teaching) Hospital, Dundee (370 Beds). Both Hospitals are associated with the University of St. Andrews. Salary and conditions of service in accordance with National Agreement.

Further particulars and forms of application from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 5th April, 1958.

BIRMINGHAM REGIONAL HOSPITAL BOARD. BIRMINGHAM (DUDLEY ROAD) GROUP. Whole-time CONSULTANT PATHOLOGIST. Based at Dudley Road Hospital, with duties at other hospitals in Group and in associated hospitals in neighbouring groups. Wide experience and high qualification required.

Applications (15 copies) stating name, age, nationality, qualifications, present and previous appointments and details of 3 referees, to Secretary, Regional Hospital Board, 10, Augustus-road, Birmingham, 15, by 10th April, 1958.

BIRMINGHAM REGIONAL HOSPITAL BOARD. STAFFORD GROUP OF HOSPITALS. Part-time CONSULTANT RADIOLOGIST (9 notional half-days weekly). Duties mainly at Staffordshire General Infirmary; also at St. George's Hospital, Stafford. Wide experience specialty and higher qualification essential.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments and details of 3 referees, to Secretary, Regional Hospital Board, 10, Augustus-road, Birmingham, 15, by 10th April, 1958.

BIRMINGHAM REGIONAL HOSPITAL BOARD. DUDLEY ROAD HOSPITAL, BIRMINGHAM. Whole-time CONSULTANT SURGEON (second vacancy). Higher qualification and wide experience specialty essential.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments and details of 3 referees, to Secretary, Regional Hospital Board, 10, Augustus-road, Birmingham, 15, by 10th April, 1958.

BIRMINGHAM REGIONAL HOSPITAL BOARD. ASSISTANT SENIOR MEDICAL OFFICER required to assist Senior Administrative Medical Officer at Board headquarters in planning and organisation of hospital and specialist services. Previous experience in public health and or hospital administration desirable. Superannuable. Salary £1680–£80 (4)–£100 (1)–£2100.

Applications, stating age, experience and qualifications, and naming 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, by 25th March, 1958.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time SENIOR CASUALTY OFFICER at Preston Royal Infirmary (resident or non-resident). Appointee will work under general supervision of consultants. Tenure of post limited to 4 years; salary within range £1653 15s. (aged 32 or over)–£52 10s.–£2126 5s., according to experience, &c.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 25th March, 1958.

NEWCASTLE REGIONAL HOSPITAL BOARD. ASSISTANT RADIOTHERAPIST (Senior Hospital Medical Officer status), whole-time or maximum part-time for 9 notional half-days per week, for Regional Radiotherapy Service. Particulars of the scope and duties of the appointment may be obtained from the Director, Radiotherapy Department, Newcastle General Hospital, Westgate-road, Newcastle upon Tyne, 4.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 28 days.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens CONSULTANT ORTHOPÆDIC AND TRAUMATIC SURGEON required, Clwyd and Deeside Hospital Management Committee area immediately.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

NORTHERN IRELAND HOSPITALS AUTHORITY. The Authority invite applications for an appointment of CONSULTANT SURGEON at hospitals managed by the South Belfast Hospital Management Committee. In the first instance the appointment will be on a part-time basis of 6 half-days per week and the terms and conditions will be in accordance with the application of the Spens report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 1st May, 1958.

NEW ZEALAND. PALMERSTON NORTH HOSPITAL BOARD, PALMERSTON NORTH, NEW ZEALAND. Applications are invited from registered medical practitioners for the position of ASSISTANT VISITING OPHTHALMIC SURGEON at the Palmerston North Hospital. Salary in accordance with Hospital Employment (Medical Officers) Regulations, 1957, on the basis of 2 sessions per week, i.e., 7 hours per week. Full rights of private practice available. Further information and conditions of appointment pertaining to this position may be obtained from the offices of the New Zealand Government, 415, Strand, London, W.C.2.

Applications, giving full particulars as to age, qualifications and experience, and accompanied by recent testimonials and advice as to the earliest date on which appointment can be taken up, to be addressed to the Secretary, Palmerston North Hospital Board, P.O. Box 607, Palmerston North, New Zealand.

R. S. WILSON, Secretary.

TASMANIA. LAUNCESTON GENERAL HOSPITAL, LAUNCESTON. Applications are invited from qualified medical practitioners for the position of DEPUTY SUPERINTENDENT Salary £A2000 p.a. If the applicant is in possession of higher qualifications in medicine, his commencing salary will be £A2250 p.a. An assisted passage can be arranged through the Immigration Department.

Applications to be addressed to the General Superintendent from whom any further particulars regarding appointment may be obtained.

B. W. GRIFFITHS, Secretary.

Hospital Services: Junior Appointments

BOLINGBROKE HOSPITAL, Wandsworth Common, S.W.11. HOUSE PHYSICIAN (resident), vacant 31st March, 1958. Open to registered practitioners and pre-registration candidates.

Apply Hospital Secretary, enclosing copies of 3 recent testimonials, by 17th March, 1958.

BROOK GENERAL HOSPITAL, Shooters Hill-road, S.E.18. SENIOR HOUSE OFFICER (general medicine). 2 posts vacant early April, tenable for 1 year (90 acute medical beds). Salary £819 10s. p.a. less £150 p.a. if resident.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. RESIDENT HOUSE SURGEON (orthopædic) required, early April.

Applications, stating age, qualifications, experience, copies 2 recent testimonials, to Secretary, Board of Governors, The Hammersmith, West London, and St. Mark's Hospitals, Ducane-road, W.12, by 17th March.

HORNSEY CENTRAL HOSPITAL, Park-road, N.8. JUNIOR HOSPITAL MEDICAL OFFICER, resident post offering wide experience in all branches of medicine, required at above general practitioner Hospital of 60 Beds with the necessary Consultant services. The Hospital may be visited by direct appointment.

Application forms obtainable from and returnable to the Group Secretary, Archway Group Hospital Management Committee, 46, Cholmeley-park, N.6 (ARChway 3070, extension 527), by 18th March.

LEWISHAM GROUP LABORATORY, Lewisham Hospital, London, S.E.13. Applications are invited for 1 of 2 posts of SENIOR HOUSE OFFICER in Pathology. Vacant about mid-April. The appointment may be either fully resident or resident only when on duty.

Applications, stating age, qualifications and experience, with copy testimonials or names of referees, to Group Secretary, Lewisham Hospital, S.E.13.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of SENIOR HOUSE OFFICER to the Obstetric and Gynæcological Department. The post becomes vacant on 5th May, 1958.

Applications (6 copies), together with 6 copies of 3 recent testimonials, should be received by the undersigned by 14th March, 1958. H. BRIERLEY, House Governor.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of REGISTRAR or SENIOR REGISTRAR (according to experience) in the department of neurosurgery. A higher surgical qualification is essential.

Applications (12 copies), giving the names and addresses of 3 referees, should be received by the undersigned by 25th March, 1958. H. BRIERLEY, House Governor.

MARIE CURIE HOSPITAL, 66, Fitzjohn's-avenue, Hampstead, N.W.3. HAREFIELD AND NORTHWOOD GROUP HOSPITAL MANAGEMENT COMMITTEE. RESIDENT MEDICAL OFFICER (House Officer grade) required mid-April.

Applications, with copies of testimonials, to the Administrative Officer by 22nd March, 1958.

MIDDLESEX HOSPITAL, W.1. Applications invited for post of REGISTRAR in Anæsthetics.

Rules and application form, obtainable from Deputy Superintendent, should be returned, naming 2 referees, by 31st March.

MILE END HOSPITAL, Bancroft-road, London, E.1. (483 Beds.) HOUSE PHYSICIAN (pre- or post-registration). Post vacant 17th March, 1958.

Application forms, obtainable from Physician-Superintendent, to be returned by 14th March, 1958, with copies of not more than 3 testimonials.

NELSON HOSPITAL, Kingston-road, Merton, S.W.20. (123 Beds.) HOUSE SURGEON (resident). Approved for pre-registration service. Post vacant now.

Applications, stating age, qualifications, &c., and the names and addresses of 2 referees, to the Secretary at above address.

NORTH MIDDLESEX HOSPITAL, London, N.18. Senior HOUSE OFFICER for Thoracic Surgical Unit, resident, required for 24th March. 6 months' appointment, with possible extension to 1 year. The post, which is recognised for F.R.C.S., offers experience in all types of tuberculous and non-tuberculous thoracic surgery.

Applications, stating age, nationality, qualifications, experience, with copies of recent testimonials and/or names of 2 referees, to Hospital Secretary.

NORTH MIDDLESEX HOSPITAL, London, N.18. Senior HOUSE OFFICER in Anæsthetics, resident, required, for 14th April. Candidates should have had previous anæsthetic experience. Hospital recognised for training for D.A. and F.F.A. R.C.S. Post offers wide experience in anæsthetics. Appointment is for 6 months in the first instance with possible extension to 1 year.

Applications, stating age, nationality, qualifications, experience, with copies of recent testimonials and/or names of 2 referees, to Hospital Secretary, by 19th March.

PLAISTOW MATERNITY HOSPITAL, Howards-road, Plaistow, London, E.13. RESIDENT OBSTETRIC OFFICER (House Officer, post-registration) required for 6 months commencing 8th April, 1958. This post offers excellent experience as sole resident in charge of 64 beds.

Apply to Hospital Secretary not later than 17th March, 1958, enclosing copies of 2 testimonials.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. Applications are invited for the appointment of RESIDENT HOUSE SURGEON (Senior House Officer) to Orthopædic and Casualty Departments at above Hospital for a period of 6 months, vacant immediately.

Applications to Group Secretary, Tottenham Group Hospital Management Committee, The Green, N.15.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. PÆDIATRIC HOUSE PHSYCIAN (Male or Female, House Officer, third post). Duties will include some work in related departments (e.g., Diabetic Clinic, &c.). 6 months commencing 13th April, 1958. Post recognised for D.C.H.

Applications, with the names of 3 referees, to Hospital Secretary by 22nd March, 1958.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. SENIOR OBSTETRIC HOUSE SURGEON (Male or Female, Senior House Officer grade). 6 months commencing 1st May, 1958. Post recognised for M.R.C.O.G.

Applications with the names of 3 referees to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 22nd March, 1958.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. JUNIOR CASUALTY OFFICER (House Officer, third post) required for 6 months commencing 10th April, 1958.

Applications, with the names of 3 referees, to Hospital Secretary by 22nd March, 1958.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. OBSTETRIC HOUSE SURGEON (Male or Female, House Officer, third post). 6 months commencing 1st May, 1958. Successful candidate may be eligible for appointment as Senior Obstetric House Surgeon (Senior House Officer grade) for the following 6 months. Post recognised for M.R.C.O.G.

Applications, with the names of 3 referees, to Hospital Secretary by 22nd March, 1958.

REGIONAL NEUROSURGICAL CENTRE (66 Beds), Brook General Hospital, Shooters Hill-road, S.E.18. SENIOR HOUSE OFFICER (neurosurgery). Post recognised for F.R.C.S. and D.P.M., and provides excellent opportunity for training in neurology.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ROYAL FREE HOSPITAL. Applications are invited from registered medical practitioners for the post of SENIOR CASUALTY OFFICER at the Royal Free Hospital, Gray's Inn-road, W.C.1. The appointment is full-time, resident, for 6 months, duties to commence on 1st April, 1958. Salary and conditions of service in accordance with those laid down by the Ministry of Health for Senior House Officers.

Application forms may be obtained from the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 13th March, 1958.

ROYAL MARSDEN HOSPITAL, Fulham-road, London, S.W.3. Applications are invited from registered medical practitioners for the post of HOUSE SURGEON (resident). Salary £577 10s. p.a. Post is tenable for 6 months from 13th April, 1958.

Forms of application are obtainable from the House Governor, to whom applications, together with copies of 3 recent testimonials, should be sent before 12th March.

ROYAL NORTHERN HOSPITAL, Holloway, N.7. TemPORARY SENIOR MEDICAL REGISTRAR (full-time, non-resident) required for 6 months in the first instance.

Application forms, from Hospital Secretary, to be returned as soon as possible.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited to fill a vacancy as REGISTRAR in Neurosurgery at the Regional Neurosurgical Centre at the Brook Hospital, Woolwich, S.E.18, for 1 year in the first instance as from 1st June, 1958. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales).

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 22nd March, 1958.

SOUTH EAST REGIONAL THORACIC SURGERY UNIT (50 Beds), Brook General Hospital, Shooters Hill-road, S.E.18. SENIOR HOUSE OFFICER. Vacant 14th April. Recognised for F.R.C.S. 6 months' appointment and may then be renewed for a further period. The Unit treats all types of Chest Diseases and offers opportunity for comprehensive training in Thoracic Surgery.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Female medical practitioners for the appointment of GYNÆCOLOGICAL HOUSE SURGEON. Vacant 23rd May, 1958. Recognised for the M.R.C.O.G.

Application forms from the Secretary.

SOUTH WESTERN HOSPITAL, Landor-road, S.W.9. Applications are invited from Women candidates for the post of HOUSE SURGEON (pre-registration) at the above Hospital. Vacant immediately. Duties include general surgery and the successful candidate will also be required to relieve the House Surgeon at the Annie McCall Maternity Hospital.

Application forms, from the Hospital Secretary, to be returned immediately.

ST. GEORGE'S HOSPITAL, S.W.1. Applications are invited for the post of ORTHOPÆDIC REGISTRAR at this Hospital. This appointment is for 1 year in the first instance, and the candidate will be required to take up duty on, or as soon as possible after, 16th May, 1958. Possession of the Diploma of the F.R.C.S. (England) will be an advantage.

Applications, stating age, education, qualifications, experience, and the names and addresses of 2 referees, should reach the undersigned not later than 22nd March, 1958.

P. H. CONSTABLE, House Governor.

ST. MARY ABBOT'S HOSPITAL, Marloes-road, Kensington, W.8. Applications are invited for appointment as REGISTRAR (obstetrics and gynæcology). Previous experience essential and preference given to candidates with a higher qualification. Post recognised for M.R.C.O.G. Candidates may visit the Hospital by arrangement.

Applications (5 copies) to be submitted by 21st March, 1958, on forms obtainable from and returnable to Group Secretary, Fulham and Kensington Hospital Management Committee, 5, Collingham-gardens, S.W.5. (L.151.)

ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. Senior HOUSE OFFICER (Casualty Department). Recognised for F.R.C.S. There are 2 Senior House Officers in the Department, which provides good general experience. 6 months' resident appointment and may then be renewed.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. GILES' HOSPITAL, Camberwell, S.E.5. Applications invited for appointment as SENIOR HOUSE OFFICER (obstetrics and gynæcology). Vacant from 1st April, 1958. Resident post.

Apply, giving age, qualifications and previous posts with copy testimonials or names of 2 referees, to Group Secretary, Camberwell Hospital Management Committee, Dulwich Hospital, East Dulwich-grove, S.E.22.

ST. JAMES' HOSPITAL, Balham, London, S.W.12. South WEST METROPOLITAN REGIONAL HOSPITAL BOARD. E.N.T. REGISTRAR (resident) required.

Application forms, obtainable from the Group Secretary, Wandsworth Hospital Group, at above address, to be completed and returned by 22nd March.

ST. STEPHEN'S HOSPITAL, Chelsea, S.W.10. Senior HOUSE PHYSICIAN (Senior House Officer) General Medicine, including chest diseases. Non-resident. Vacancy mid-April.

Applications, naming 2 referees, to Medical Superintendent.

WANSTEAD HOSPITAL, Hermon Hill, E.11. (191 Beds.) Applications invited for post of SENIOR HOUSE OFFICER (resident), vacant 1st April. Salary £819 10s. less £150 p.a. for board-residence. Post includes care of general surgical and orthopædic cases and duties in Casualty Department. Post recognised for F.R.C.S. examination.

Applications, stating age, qualifications, experience, together with copies of 2 recent testimonials, should be sent to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WEST LONDON HOSPITAL, Hammersmith-road, London, W.6. Whole-time NON-RESIDENT REGISTRAR (general surgery) required 1st May.

Applications, stating age, qualifications, experience, names 2 referees, to Secretary, Board of Governors, The Hammersmith, West London and St. Mark's Hospitals, Ducane-road, W.12, by 17th March.

WEST LONDON HOSPITAL, Hammersmith-road, London, W.6. 2 RESIDENT HOUSE PHYSICIANS (general medicine) required. Posts vacant 14th and 22nd April. Pre-registration candidates considered.

Applications, stating age, qualifications, experience, copies 2 recent testimonials, to Secretary by 15th March.

WESTMINSTER CHILDREN'S HOSPITAL. Westminster Hospital Teaching Group. MEDICAL REGISTRAR required from 1st April, 1958, for 1 year, renewable for a second year.

Apply, naming 3 referees, to the Secretary, Westminster Children's Hospital, Vincent-square, S.W.1, by 14th March, 1958.

WHIPPS CROSS HOSPITAL, Leytonstone, E.11. Appli-cations are invited from either fully or provisionally registered medical practitioners for 2 posts of HOUSE SURGEON in the Orthopædic Department. Both posts are recognised for the F.R.C.S.

Application forms from the Hospital Secretary, to be returned within 10 days of appearance of this advertisement.

WHITTINGTON HOSPITAL, London, N.19. Surgical REGISTRAR required for Unit of 74 Beds consisting of general surgical beds with large gastroenterological section. F.R.C.S. essential. Vacant now. Hospital may be visited by appointment with the Medical Superintendent (ARChway 3070, extension 440).

Application forms obtainable from and returnable to Group Secretary, Archway Group Hospital Management Committee, 46, Cholmeley-park, N.6, by 18th March.

ALEXANDRIA, DUNBARTONSHIRE. VALE OF LEVEN HOSPITAL. BOARD OF MANAGEMENT FOR DUNBARTONSHIRE HOSPITALS. Applications are invited for the post of SENIOR HOUSE OFFICER in Surgery and Gynæcology at the above Hospital. This post may now be held by applicants who have completed 2 pre-registration House posts.

Applications, together with the names of 2 referees, to be submitted immediately to the Medical Superintendent at the Hospital.

ALTON, HAMPSHIRE. LORD MAYOR TRELOAR ORTHOPÆDIC HOSPITAL. Applications are invited from registered medical practitioners for the post of Whole-time ORTHOPÆDIC REGISTRAR. Post provides experience in non-pulmonary tuberculosis and general orthopædics and includes attendances at peripheral clinics. It is recognised for 6 months' training under F.R.C.S. regulations. The post is resident for married or single persons. Canvassing disqualifies, but visit to Hospital welcomed.

Write to the Secretary for application form.

ASCOT, BERKSHIRE. HEATHERWOOD ORTHO-PÆDIC HOSPITAL. (200 Beds.) ORTHOPÆDIC HOUSE SURGEON (2 posts). Applications are invited from suitably qualified candidates for existing resident vacancies. Hospital is a regional centre for all general orthopædic conditions, including fractures, and performs a large amount of outpatient work.

Applications, giving full details with names of 2 referees, to Secretary.

ASHFORD HOSPITAL, Ashford, Middlesex. (560 Beds.) STAINES GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE PHYSICIAN for general medical duties. 6-month appointment, vacant 1st April, 1958. Preference given to pre-registration candidates.

Applications, stating age, qualifications and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGE-MENT COMMITTEE. SENIOR HOUSE OFFICER or JUNIOR HOSPITAL MEDICAL OFFICER (pædiatrics), depending upon experience, required at Ashton-under-Lyne General Hospital. Neonatal experience would be especially valuable. Modern pædiatric and premature baby units. Recognised for D.C.H. Vacant 1st May. Junior Hospital Medical Officer appointment limited to 4 years.

Applications, with copies of 2 references, to Group Secretary, General Hospital, Ashton-under-Lyne, Lancs.

ALTRINCHAM GENERAL HOSPITAL AND ANNEXE. SENIOR HOUSE OFFICER (medical). This appointment is in a busy Hospital and offers excellent opportunities of practical experience. Vacant end of March.

Applications, together with 2 recent testimonials, to Group Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

BEBINGTON, CHESHIRE. CLATTERBRIDGE HOS-PITAL. CENTRAL WIRRAL GROUP.

HOUSE OFFICER (general medicine and geriatrics). Recognised pre-registration.

HOUSE OFFICER (general surgery). Recognised pre-registration.

Posts are tenable for 6 months from 1st March, 1958. Salary according to previous posts held.

Application forms, from Secretary, to be returned immediately.

BIRMINGHAM ACCIDENT HOSPITAL AND RE-HABILITATION CENTRE, Bath-row, BIRMINGHAM, 15. SENIOR HOUSE SURGEON, vacant April. Hospital is the largest traumatic unit in the country, treating 50,000 new patients a year, including 2000 burns. Ample opportunity for practical experience in all types of injury. Recognised for casualty training by Royal College of Surgeons. Residential charge £150 p.a.

Applications, with names of 2 referees, to Administrator.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) Burton-on-Trent Group, General Hospital, Burton-on-Trent

REGISTRAR (Surgical Officer), General Hospital, Burton-on-Trent. (251 Beds.) Resident or non-resident. Furnished or unfurnished flat available.

(2) Stoke-on-Trent Group, Princes-road, Stoke-on-Trent

REGISTRAR (E.N.T. surgery) for North Staffordshire Royal Infirmary. (455 Beds.) Experience specialty essential. Resident or non-resident.

(3) Wolverhampton Group, The Royal Hospital, Wolverhampton

REGISTRAR (orthopædics and traumatic surgery). The Royal Hospital, Wolverhampton. All types of traumatic and orthopædic conditions, also industrial work and rehabilitation which is carried out at a special unit of 60 beds. Married quarters available.

Application forms from Group Secretaries, to be returned by 17th March, 1958.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer grade) for duties in the United Hospitals and resident at the General Hospital or at the Queen Elizabeth Hospital. The post is tenable for 1 year. The appointment is recognised for the purpose of taking the F.F.A. R.C.S. examination.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Edgbaston, Birmingham, 15, and should be returned to him as soon as possible.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. (350 Beds.) HOUSE SURGEON required. Recognised pre-registration appointment. Accommodation available for married officer with no children.

Apply, naming 2 referees, to Group Secretary, South West Durham Hospital Management Committee, at above address.

BISHOP'S STORTFORD, HERTFORDSHIRE. HERTS AND ESSEX GENERAL HOSPITAL. Applications are invited for post of HOUSE OFFICER (medical) (pre-registration). Salary £467 10s.–£522 10s. p.a., less £125 in respect of residential emoluments. Appointment to commence 10th March, 1958.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials or names of referees, to Hospital Secretary.

BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.

The Royal Infirmary, Bolton. (238 Beds.)

RESIDENT SENIOR HOUSE OFFICER in Surgery (Assistant Resident Surgical Officer). Vacant 1st April, tenable for 12 months, and recognised for F.R.C.S.

SENIOR HOUSE OFFICER (resident or non-resident) for Casualty Department, with some orthopædic duties. Vacant 7th April. Recognised for F.R.C.S. Staff of 2 with Consultant supervision and adequate relief. Post offers good casualty/accident experience.

Applications, stating age, nationality, qualifications, experience and the names of 2 referees, should be sent immediately to Group Secretary, Bolton and District Hospital Management Committee, The Royal Infirmary, Bolton.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) HOUSE SURGEON (pre-registration and recognised for F.R.C.S.), vacant mid-March.

Applications, stating usual particulars, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRISTOL. STOKE PARK GROUP HOSPITAL MAN-AGEMENT COMMITTEE. Applications are invited for an appointment as a JUNIOR HOSPITAL MEDICAL OFFICER in the above Group of mental deficiency hospitals (1868 Beds). A genuine interest in the problems of the mental defective is essential in these progressive hospitals pursuing an active programme of rehabilitation. Lecture demonstrations are given at the Hospital as part of the postgraduate D.P.M. course organised by the University of Bristol, and the successful candidate will be encouraged to take the D.P.M. Temporary unfurnished flat available. Salary £852 10s. rising by £55 to £1182 10s. p.a.

Applications, giving full particulars, qualifications and experience, together with names and addresses of 2 referees, to the Medical Superintendent, Stoke Park Hospital, Stapleton, Bristol, as soon as possible.

BOURNEMOUTH (near). CHRISTCHURCH HOSPITAL, CHRISTCHURCH, HAMPSHIRE. (334 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (pre-registration intern) required for post becoming vacant on 18th March, 1958.

Applications to the Hospital Secretary.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road, BOSCOMBE. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of 2 GENERAL HOUSE SURGEONS. The appointments, which become vacant on the 24th March and mid-April, are recognised for the F.R.C.S. examination and for pre-registration purposes.

Applications to the Hospital Secretary.

BRADFORD ROYAL INFIRMARY. Resident Senior HOUSE OFFICER (medicine and pathology). This post is of a supervisory nature in 2 acute general medical wards with a Junior House Officer, combined with duties in the Department of Pathology. Vacant now.

Applications, stating age, nationality, qualifications and experience, with copy testimonials, to the Secretary.

BROMSGROVE, WORCESTERSHIRE. BARNSLEY HALL HOSPITAL. (For mental and nervous diseases—750 Beds.) Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER. Excellent opportunities for a young man to study in a modern mental hospital; modern treatments and up-to-date psychiatry. House available. Remuneration will be in accordance with the terms and conditions of service issued by the Ministry of Health.

Applications, stating age and experience, together with the names of 3 referees, to the Medical Superintendent.

BURTON-ON-TRENT GENERAL HOSPITAL. Locum SENIOR HOUSE OFFICER (medicine) required for a period of approximately 2 months, to mid-April, 1958.

Apply, Group Secretary.

BURY ST. EDMUNDS. WEST SUFFOLK GENERAL HOSPITAL. (262 Beds.) Applications are invited for the following posts:—

(*a*) HOUSE OFFICER (pre-registration) or SENIOR HOUSE OFFICER for Orthopædic and Casualty duties. Recognised for F.R.C.S. (surgical). Vacant immediately.

(*b*) JUNIOR HOSPITAL MEDICAL OFFICER for Casualty duties. Resident post for single person, otherwise non-resident.

Inquiries and applications to Hospital Secretary.

CAMBRIDGE. THE UNITED CAMBRIDGE HOS-PITALS. ADDENBROOKE'S HOSPITAL. CLINICAL ASSISTANT (part-time) in the Ophthalmological Outpatient Department for 1 notional half-day per week on Saturday mornings. The appointment will be subject to annual review. Salary £183 15s. p.a.

Applications, stating age, qualifications and experience with names of 2 referees to the Secretary, Addenbrooke's Hospital, by 22nd March.

CANTERBURY. KENT AND CANTERBURY HOS-PITAL. (277 Beds.) The post of PÆDIATRIC HOUSE PHYSICIAN, recognised for D.C.H., includes work in the ward and Outpatient Department and also provides experience in the care of the newborn. Opportunities exist for the study of preventive medicine among children, and child guidance work. Post vacant early April, 1958. National Health Service salary and conditions.

Applications, together with copies of 2 testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOS-PITAL. (277 Beds.) The post of SENIOR HOUSE PHYSICIAN is now vacant at Stodmarsh Road Annexe. Duties include care of 30-bedded unit of chest diseases, also work at the Chest Clinic and with the Pneumoconiosis Unit. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOS-PITAL. (277 Beds.) The post of GENERAL SURGICAL AND UROLOGICAL HOUSE SURGEON (pre-registration or third post), which is recognised for the F.R.C.S., is now vacant. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOS-PITAL. (277 Beds.) GYNÆCOLOGICAL HOUSE SURGEON required at Highland Court Annexe, a unit of 25 gynæcological beds situated 3 miles from the above Hospital, with all ancillary services available. Recognised for M.R.C.O.G. 6 months' appointment. Post vacant early April, 1958. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARDIFF. GLAN ELY HOSPITAL, Fairwater, CARDIFF. There will be a vacancy for a SENIOR HOUSE OFFICER early in April in this Hospital, which has 240 Beds for the treatment of tuberculosis—both pulmonary and non-pulmonary—and allied chest conditions. Experience available in thoracic surgery and operative treatment of bone and joint, genitourinary and glandular tuberculosis.

Form of application from Group Secretary, 44, Cathedral-road, Cardiff.

CARLISLE. CUMBERLAND INFIRMARY. 2 House SURGEONS required. Recognised for pre-registration purposes and for F.R.C.S. examination.

Reply immediately, with names for reference, to the Group Secretary, Cumberland Infirmary, Carlisle.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. (733 Beds.) CASUALTY OFFICER (Senior House Officer). Post recognised for F.R.C.S. Vacant early April.

Applications, stating age, qualifications and experience, with copies of testimonials and the names of 2 referees, should be sent to the Group Secretary at above address.

CARLUKE, LANARKSHIRE. LAW HOSPITAL. (790 Beds.) Applications are invited for the undernoted posts:—

(*a*) JUNIOR HOSPITAL MEDICAL OFFICER and (*b*) HOUSE OFFICER in Orthopædic Surgery. The unit consists of 120 Beds and deals with acute orthopædic and accident work from a large part of Lanarkshire, and offers excellent experience.

(*c*) RESIDENT HOUSE SURGEON (pre- or post-registration) for the 6 months commencing 1st February, 1958.

(*d*) Locum ANÆSTHETIST (Senior House Officer or Junior Hospital Medical Officer grading) for a period of 2 months.

Applications, stating age, qualifications and previous experience, together with the names of 2 referees, should be sent to the Group Medical Superintendent, Law Hospital, Carluke, as soon as possible.

CHELMSFORD AND ESSEX HOSPITAL. (161 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON. Pre-registration post. The post offers good surgical experience. Recognised for the F.R.C.S.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. Applications are invited from registered practitioners for the post of RESIDENT PÆDIATRIC HOUSE OFFICER (Male or Female) commencing 31st March, 1958, to work in the Pædiatric Unit of the Chelmsford Hospital Group. The Unit includes a premature baby nursery of 10 Cots and a Neonatal Department in the maternity block of the Hospital. The Department is recognised for the D.C.H.

Applications, stating age, nationality, qualifications and experience, together with recent testimonials, should be received not later than 18th March, by the Group Secretary, Chelmsford Group Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford.

CHELTENHAM GENERAL HOSPITAL. (220 Beds.) HOUSE SURGEON required (pre- or post-registration) immediately. The post offers a wide experience in general surgery, gynæcology, and orthopædic surgery. Post recognised for the F.R.C.S.

Apply with names of 2 referees to Secretary, General Hospital, Cheltenham.

CHELTENHAM. ST. PAUL'S HOSPITAL. (39 surgical, 86 geriatric beds.) SENIOR HOUSE OFFICER required. Main duties concerned with surgical beds. Person appointed would also be expected to carry out certain duties concerned with geriatric patients.

Applications, giving details of qualifications, experience, and names of 3 referees, to the Group Secretary, General Hospital, Sandford-road, Cheltenham.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botleys Park War Hospital). (430 Beds.) ORTHOPÆDIC HOUSE SURGEON (Senior House Officer or House Officer (intern) grade). 100 orthopædic beds. Post recognised for F.R.C.S. and pre-registration service. Salary in accordance with terms and conditions of National Health Service. Post vacant 21st April, 1958.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent, St. Peter's Hospital, Chertsey, Surrey.

CHESTER. BARROWMORE HOSPITAL, Great Barrow, CHESTER. SENIOR HOUSE OFFICER (medical), Male, required. Salary £819 10s. p.a., less £150 for residence. The Hospital, which is modern and for the treatment of pulmonary tuberculosis, contains a Regional Thoracic Surgical Unit and a General Chest Ward. Applications from ex-patients considered.

Inquiries and applications, stating names of 2 referees, to be sent to Physician-Superintendent.

CHICHESTER. ST. RICHARD'S AND ROYAL WEST SUSSEX HOSPITALS. Applications are invited for the post of RESIDENT OBSTETRIC AND GYNÆCOLOGY SENIOR HOUSE SURGEON, for 6 months in first instance. Obstetrics at St. Richard's (where resident) and gynæcology at both hospitals. Occasional relief duties at Maternity Hospital, Rustington (52 Beds). Salary £819 10s., less £150 p.a. for residence.

Apply Group Secretary, 174, Broyle-road, Chichester, giving names of 2 referees.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for :—

Essex County Hospital, Colchester (189 Beds)

Post of HOUSE SURGEON. Recognised for F.R.C.S.

First, second, third or pre-registration post, tenable for 6 months.

Post of SENIOR HOUSE OFFICER (casualty and radiotherapy). Post tenable for 6 months or 1 year. Recognised for F.R.C.S.

Applications, with copies of 3 testimonials, to Secretary, Colchester Group Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

DUNDEE. MARYFIELD HOSPITAL. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER in an acute Geriatric Unit (59 Beds) for assessment and rehabilitation and long-term Unit (56 Beds) supervised by a Consultant specialising in geriatrics in a teaching hospital. The appointment offers excellent clinical experience in the diagnosis and treatment of acute and other illnesses of the elderly.

Applications, stating qualifications and names of 2 referees, to the Medical Superintendent.

DUNDEE. MARYFIELD HOSPITAL. Applications are invited for the post of RESIDENT HOUSE OFFICER in an acute Geriatric Unit (59 Beds) for assessment and rehabilitation and long-term Unit (56 Beds) supervised by a Consultant specialising in geriatrics in a teaching hospital. The appointment offers excellent clinical experience in the diagnosis and treatment of acute and other illnesses of the elderly. Recognised for pre-registration.

Applications, stating qualifications and names of 2 referees, to the Medical Superintendent.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) SENIOR HOUSE OFFICER (casualty), vacant mid-April, resident post. Recognised for periods of 6 months' casualty training for F.R.C.S. The staffing of the department is a Senior Casualty Officer and 2 Senior House Officers.

Apply, stating age, experience, and 2 names for reference, to Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) SENIOR HOUSE OFFICER (E.N.T.), vacant immediately. Recognised for 6 months' training for F.R.C.S. (otolaryngology).

Apply, stating full details, with copies of 2 recent testimonials, to Secretary.

EAST GRINSTEAD, SUSSEX. QUEEN VICTORIA HOSPITAL (Plastic Surgery and Jaw Injuries Unit). RESIDENT HOUSE OFFICER required. Appointment vacant 1st April, 1958, for 6 months, offering considerable opportunity to gain experience in plastic surgery and jaw injuries work.

Apply, stating age, and names of 3 referees, to Hospital Secretary.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. RESIDENT PÆDIATRIC HOUSE PHYSICIAN for above Hospital. Post vacant 9th April, 1958. 6 months' appointment. Post recognised for D.C.H. and for pre-registration purposes.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Administrator of Hospital by 14th March, 1958.

EDGWARE GENERAL HOSPITAL. (715 Beds.) Junior HOSPITAL MEDICAL OFFICER, non-resident, required in the Casualty Department at above Hospital. Post vacant 20th March, 1958.

Apply, stating age, nationality, qualifications and giving details of experience, together with the names and addresses of 2 referees, to Group Secretary, Edgware General Hospital, Edgware, Middlesex, by 15th March, 1958.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT HOUSE SURGEON—third post. Vacant 30th March, 1958. Post provides experience and duties in general surgery and orthopædics. 6-month appointment. Post recognised for F.R.C.S.

Applications, with the names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, at Chase Farm Hospital.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT OBSTETRICAL AND GYNÆCOLOGICAL HOUSE SURGEON (2nd post pre-registration) required 22nd April, 1958. 6 months' appointment. Post recognised for D.Obst. R.C.O.G. examination. Unit also recognised for M.R.C.O.G. examination.

Applications, with the names of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, at Chase Farm Hospital, Enfield.

ENFIELD. WAR MEMORIAL HOSPITAL, Chase Side, ENFIELD, MIDDLESEX. RESIDENT SENIOR HOUSE OFFICER required middle March, 1958, for General Medical and Surgical duties in acute General Hospital of 61 Beds. 12 months' appointment.

Applications, with names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, Chase Farm Hospital, The Ridgeway, Enfield, Middlesex.

EPPING. ST. MARGARET'S HOSPITAL. Senior House OFFICER (anæsthetics) required, resident. Post vacant 28th March. Busy general Hospital, easy access to London. Good experience. Post recognised for D.A.

Applications, with copies of recent testimonials, to be sent to the Group Secretary, Epping Group Hospital Management Committee, Oak Cottage, The Plain, Epping, Essex, by 19th March, 1958.

EXMINSTER HOSPITAL, near Exeter. (1629 Beds, mental.) JUNIOR HOSPITAL MEDICAL OFFICER required immediately. Previous psychiatric experience advisable but not essential if candidate has good general experience. Accommodation available.

Applications, stating age, nationality, qualifications and experience, with the names of 2 referees, to The Group Secretary, Devon Mental Hospital Management Committee, Exminster Hospital, near Exeter, as soon as possible.

GRANTHAM AND KESTEVEN GENERAL HOSPITAL. (117 Beds. Recognised for training for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL REGISTRAR required 4th May. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 17th March, 1958, giving age, nationality, qualifications, present and previous appointments, with dates, naming 3 referees.

GRIMSBY. SCARTHO ROAD HOSPITAL. Grimsby HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE OFFICER (surgical) required (pre-registration or Senior House Officer grade) for duties in acute surgical unit of 56 Beds, modern theatre and Outpatient Department. Offers excellent experience of all types of general surgery. Married quarters available. Post vacant end of April, 1958.

Applications, with names of 2 referees, to Hospital Secretary.

HALIFAX AREA HOSPITALS MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER in Obstetrics and Gynæcology required for duty at the Halifax General Hospital and Royal Halifax Infirmary. 100 obstetrical and 40 gynæcological beds. Post recognised for M.R.C.O.G. Vacant on 24th May, 1958.

Applications to be forwarded to the Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. Senior HOUSE OFFICER in Anæsthetics required. Post recognised for F.F.A. R.C.S. and D.A.

Applications to be forwarded to the Secretary, Royal Halifax Infirmary, Halifax.

GLASGOW NORTHERN HOSPITALS BOARD OF MANAGEMENT. Applications are invited for a post of SENIOR HOUSE OFFICER in Medicine at Stobhill General Hospital, Glasgow. The appointment will be for 1 year in the first instance.

Applications, stating age, qualifications, experience, and present appointment, and naming 2 referees, to be lodged with the Secretary, 13, Woodside-place, Glasgow, C.3, by 21st March, 1958.

GLASGOW ROYAL INFIRMARY. Senior House Officers.

(*a*) General medicine.
(*b*) Radiodiagnosis.
(*c*) Ear, nose and throat surgery.

Duties at above Infirmary.

Write, giving 3 names for reference, not later than 15th March, 1958, to the Secretary, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

HASTINGS AND ST. LEONARDS. BUCHANAN HOS-PITAL. (91 Beds.) Locum HOUSE SURGEON (gynæcology) required. 13th March–28th March inclusive. Salary £10 9s. a week, less board.

Apply, with names of 2 referees, to the Hospital Administrator.

HASTINGS HOSPITAL MANAGEMENT COMMITTEE. Locum ORTHOPÆDIC REGISTRAR required for whole-time duties. Post vacant now. Remuneration £19 5s. per week. Non-resident.

Apply, giving details of qualifications and experience, to Group Secretary, 11, Holmesdale-gardens, Hastings.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) Applications are invited for the post of HOUSE SURGEON (surgery/E.N.T.—pre-registration), vacant now. This Hospital is the main surgical hospital in the Hastings area and the post offers excellent experience.

Apply, with 2 testimonials or the names of 2 referees, to Hospital Administrator.

HASTINGS. ST. HELEN'S HOSPITAL. (493 Beds.) HOUSE SURGEON required, pre-registration post, vacant now, recognised for F.R.C.S. Modern theatre.

Applications to Hospital Administrator.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (pædiatrics), which is recognised for the D.C.H.

Applications, together with copies of 2 recent testimonials, should be sent to the Hospital Secretary at once.

HEREFORD COUNTY HOSPITAL. (339 Beds.) House OFFICER (surgery) required immediately. Hospital recognised for F.R.C.S.

Applications, with copies of 2 recent testimonials, to Medical Superintendent, County Hospital.

HEREFORD GENERAL HOSPITAL. (154 Beds.) House OFFICER (general surgery) required immediately. Pre-registration post. Hospital recognised by R.C.S. Duties include care of general surgical beds and in addition for 3 months of orthopædic beds and for 3 months of E.N.T. beds.

Applications, with copies of 2 testimonials, to be sent to the Group Secretary, Victoria House, Eign-street, Hereford.

HITCHIN, HERTFORDSHIRE. LISTER HOSPITAL. RESIDENT HOUSE SURGEON required. Post vacant 19th March, 1958. Recognised as pre-registration post and for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Medical Administrator.

HOVE GENERAL HOSPITAL. Senior House Officer (recognised for F.R.C.S.) required on 17th April, 1958. Duties of Resident Surgical Officer. Appointment for 1 year.

Applications, stating age, qualifications and full details of experience, together with names and addresses of 2 referees, to the Administrative Officer, Hove General Hospital, Hove, Sussex.

HOVE GENERAL HOSPITAL. Pre-registration House SURGEON (with ward and casualty duties) required immediately for a period of 6 months. This post is recognised for the F.R.C.S. and provides a wide experience in an active surgical unit.

Applications, stating age, qualifications, and full details of experience, together with the names and addresses of 2 referees, to the Administrative Officer, Hove General Hospital, Hove, Sussex.

HULL. KINGSTON GENERAL HOSPITAL. (419 Beds.) HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (pre-registration post). Resident, and tenable for 6 months. This post includes gynæcology and general surgery.

Applications, with 2 recent testimonials, to the Hospital Secretary.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required to commence duty immediately. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON,
Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HUDDERSFIELD. ST. LUKE'S HOSPITAL. (235 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Senior House Officer grade) at the above Hospital, to commence duties on 1st April, 1958. The duties will be mainly surgical, in a hospital which caters for chronic sick, children, maternity and acute medical and surgical patients. Salary in accordance with the terms and conditions of service for hospital medical and dental staff, £819 10s. p.a.

Applications, together with copies of 3 recent testimonials, to be sent to the undersigned as soon as possible.

H. J. JOHNSON,
Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HUDDERSFIELD (near). STORTHES HALL HOSPITAL, KIRKBURTON, near HUDDERSFIELD. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER at the above Mental Hospital (2737 Beds). Residential accommodation available for single persons. Pay and conditions of service as laid down by the Medical and Dental Whitley Council.

Applications, giving age, qualifications, experience, &c., should be sent to the Medical Superintendent immediately.

E. WALSH, Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (350 Beds.) Applications are invited for the post of HOUSE SURGEON to the E.N.T. and Ophthalmic Departments. The post is recognised for pre-registration and for the D.L.O. examination.

Applications, giving full particulars and copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (350 Beds.) Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department. Approved pre-registration post.

Applications, with copies of recent testimonials, to the Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (350 Beds.) Locum RESIDENT ANÆSTHETIST (Senior House Officer grade) required from 14th April to 14th May, 1958.

Applications, with copy testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (350 Beds.) Applications invited for post of SENIOR HOUSE OFFICER in General Medicine. Post offers excellent experience and opportunity for working for higher qualifications (M.R.C.P.). Duties are not those of House Physician, but carry outpatient responsibility and involve a small amount of research.

Applications, stating age, nationality and experience, together with recent testimonials, to Hospital Secretary as soon as possible.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (350 Beds.) Applications invited for post of HOUSE SURGEON to 2 Consultant General Surgeons. Post recognised for pre-registration and F.R.C.S. examination.

Applications, with copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Heath-ROAD WING), IPSWICH. Pre-registration post of HOUSE SURGEON to General Surgeon vacant. Recognised for R.C.S. examination.

Applications, with copies of recent testimonials, to Hospital Secretary.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRARS (2), Pædiatric Department. Whole-time. Vacant now. Previous pædiatric experience essential. Duties include work in children's unit (90 Beds), neo-natal unit and pædiatric outpatient clinics. Candidates may visit Hospital by appointment with Medical Director.

Application forms obtainable from and returnable to Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, by 18th March.

KEIGHLEY AND DISTRICT VICTORIA HOSPITAL, KEIGHLEY, YORKSHIRE. (General—139 Beds.) RESIDENT HOUSE PHYSICIAN required immediately for period of 4 months or for full term of 6 months. Approved pre-registration appointment. 4 residents on staff.

Applications, with full particulars as to age, nationality and qualifications, and copies of 2 testimonials, to be sent to Group Secretary, Hospital Management Committee, 17, St. John's Hospital, Keighley, as soon as possible.

KETTERING AND DISTRICT GENERAL HOSPITAL, NORTHAMPTONSHIRE. Applications are invited for the post of HOUSE SURGEON (pre-registration). Post recognised for F.R.C.S.

Applications, stating age, experience, and qualifications, together with copies of 3 recent testimonials, to be sent to the Group Secretary at the above address.

LEWES (near). CHAILEY HERITAGE (Craft School and Hospital), NORTH CHAILEY, near LEWES, SUSSEX (300-Bedded children's orthopædic hospital). **MID-SUSSEX HOSPITAL MANAGEMENT COMMITTEE.** JUNIOR HOSPITAL MEDICAL OFFICER. Resident post now vacant, tenable 3 years initially. Work covers long-term orthopædics and pædiatric conditions. Previous experience as either Orthopædic House Surgeon or Pædiatric House Physician necessary. Interested candidates invited to visit.

Apply, with names of 2 referees, to Medical Administrator.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

Anæsthetics

Huddersfield Group (approximately 225 Beds in the surgical specialties). Non-resident.

General Medicine

(*a*) St. James's Hospital, Leeds (to be associated with 50 Beds under the clinical care of physicians from the Teaching Hospital). Resident/non-resident. The successful candidate will be required to live-in 1 day in the 3 if non-resident.

(*b*) Pontefract and Castleford Group (65 general medical beds). Married accommodation available.

Ophthalmology

Huddersfield Group (23 eye beds and 1500 new outpatients annually). Non-resident.

Psychiatry

De la Pole Hospital, Willerby (1174 Beds), and associated clinics. Resident or non-resident. If desired, facilities for attendance at the Leeds University will be provided if the successful candidate is studying for the D.P.M.

Applications, stating age, qualifications, and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 12th March, 1958.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

Anæsthetics

Leeds A and B Groups. Recognised for F.F.A. R.C.S. and D.A. Resident or non-resident.

Psychiatry

(i) Oulton Hall Hospital, near Wakefield, and affiliated mental deficiency hospitals (approximately 400 Beds). Non-resident.

(ii) Storthes Hall Hospital, Huddersfield (2750 Beds). Person appointed will be required to undertake certain outpatient duties.

Provision will be made for the successful candidate to attend D.P.M. courses at the University of Leeds.

Applications, stating age, qualifications and details of present and previous appointments showing dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 13th March, 1958.

LEEDS. THE UNITED LEEDS HOSPITALS. THE GENERAL INFIRMARY AT LEEDS. REGISTRAR in Thoracic Surgery required from 1st April, 1958, for 1 year in the first instance. Work will include a considerable amount of cardiac and upper abdominal surgery.

Applications, stating age, experience, qualifications, previous posts, with dates, and 3 names for reference, to be sent to the Sub-Dean, School of Medicine, Leeds, 2, as soon as possible.

LANCASTER. ROYAL LANCASTER INFIRMARY. (240 Beds.) RESIDENT HOUSE OFFICER (surgical) (pre-registration post). Successful applicant will work with Consultant Surgical Unit and attend Consultative Clinics. Post tenable for 6 months. Recognised for F.R.C.S.

Applications, with names of 2 referees, to the Secretary, Royal Lancaster Infirmary, Lancaster.

LEICESTER ISOLATION HOSPITAL AND CHEST UNIT, Groby-road, LEICESTER. (328 Beds.) Applications are invited for the appointment of RESIDENT SENIOR HOUSE OFFICER (surgical). Salary £819 10s. p.a., less £150 residential emoluments. The appointment is tenable for 6 months, and may be extended for a further period of 6 months. Experience will be gained in all branches of thoracic surgery, including cardiac surgery. The post is recognised for the Final Fellowship.

Applications, giving age, qualifications, dates, &c., and copies of 2 recent testimonials, to be forwarded as soon as possible to the Department of Thoracic Surgery at the above Hospital.

LINCOLN COUNTY HOSPITAL, Sewell-road, Lincoln. (200 Beds.) Applications are invited for the appointment of RESIDENT HOUSE SURGEON (Male or Female). This is an approved pre-registration post, the duties of which are with a general surgeon. This post will be followed, if satisfactory, by appointment for a further 6 months as House Physician.

Applications, with copy testimonials, should be sent to the Group Secretary, Lincoln County Hospital, as soon as possible.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for temporary appointment to the post of SENIOR REGISTRAR in Otorhinolaryngology for the period to 30th September, 1958, for duty at Liverpool Ear, Nose and Throat Infirmary. The person appointed will be eligible to apply in the summer of 1958 for appointment for the year beginning 1st October, 1958.

Apply by 26th March, 1958, on form obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. SENIOR HOUSE OFFICER for accident service including duties in the Hand Infection Unit required 1st April, 1958. Post recognised for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Secretary of the above Hospital.

MAIDENHEAD HOSPITAL, BERKSHIRE. Applications invited for post of HOUSE PHYSICIAN, vacant 19th April. Pre-registration post.

Applications, stating age, qualifications and nationality, with names of 3 referees, to Secretary.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) **MID-KENT HOSPITAL MANAGEMENT COMMITTEE.** Applications are invited for the pre-registration post of HOUSE SURGEON. 6 months' appointment. Post vacant immediately. Salary at the rate of £467 10s.–£577 10s. A deduction at the rate of £125 a year is made for board and lodging, and other services provided.

Applications should be forwarded, as soon as possible, to the Administrative Officer at the Hospital.

MANCHESTER, 20. CHRISTIE HOSPITAL AND HOLT RADIUM INSTITUTE. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of RESIDENT SENIOR HOUSE OFFICER (radiotherapy) at the above Hospital. Suitable applicants will be eligible for the D.M.R.T. course commencing in April, 1958.

Applications, with full details and the names of 2 referees, to the Group Secretary, Withington Hospital, Manchester, 20, immediately.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of REGISTRAR in Orthopædic Surgery to the Blackpool and Fylde Group of hospitals, with main duties at Victoria Hospital, Blackpool. There are 63 orthopædic beds in the Group and busy outpatient clinics. Ample scope for gaining experience in all aspects of the work of the department. Post recognised for F.R.C.S. examination and vacant from 1st June, 1958. A furnished flat is available in the married quarters situated in a detached property in a select residential area adjacent to the Hospital.

Applications, stating age, qualifications, experience and the names and addresses of 3 referees, should be sent to the Group Secretary, Blackpool and Fylde Hospital Management Committee, Victoria Hospital, Blackpool.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of RESIDENT SURGICAL OFFICER (Registrar grade) at Wythenshawe Hospital. The post will include the responsibility for general surgical beds and is recognised by the Royal College of Surgeons.

Applications, stating age, qualifications, present post, experience and the names of 2 referees, to the Group Secretary, Withington Hospital, Manchester, 20.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of REGISTRAR in Radiotherapy at the Christie Hospital and Holt Radium Institute, Manchester. Candidates must hold either the Diploma in Radiotherapy or an F.R.C.S. or M.R.C.P.

Applications, with full details, to be forwarded to the Group Secretary, Withington Hospital, Manchester, immediately.

MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for the full-time post of ORTHOPÆDIC REGISTRAR in the Ashton, Hyde and Glossop Group of hospitals with duties mainly at Ashton-under-Lyne General Hospital. There are approximately 40 orthopædic beds and busy Orthopædic and Casualty Outpatient Departments. The post is recognised for additional training under F.R.C.S. regulations.

Applications, stating age, nationality, qualifications and experience, with copies of 2 references, should be forwarded to the Group Secretary, Ashton, Hyde and Glossop Hospital Management Committee, General Hospital, Ashton-under-Lyne, Lancashire, as soon as possible.

MANCHESTER (near). PRESTWICH (MENTAL) HOSPITAL. SENIOR HOUSE OFFICER required at above Hospital. Single quarters available. All modern treatments practised and study facilities granted.

Applications, giving full personal details, and the names and addresses of 2 referees, should be sent to the Medical Superintendent, Prestwich Hospital, P.O. Box No. 1, Prestwich, Manchester, not later than Saturday, 15th March, 1958.

MARKET DRAYTON, SHROPSHIRE. CHESHIRE JOINT SANATORIUM. SENIOR HOUSE OFFICER required for inpatient and outpatient duties with Thoracic Surgical Unit dealing with tuberculous and non-tuberculous cases for a population of approximately 500,000.

Applications to Medical Superintendent at the Sanatorium.

MIDDLESBROUGH. NORTH ORMESBY HOSPITAL. (184 Beds.) TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (surgery) for Surgical Team No. 2 at the above Hospital. The post is recognised for pre-registration service under the Medical Act, 1950.

Applications, stating full details and giving 2 names for reference, should be addressed to the Hospital Secretary as soon as possible.

MORECAMBE. QUEEN VICTORIA HOSPITAL. (100 Beds.) RESIDENT CASUALTY OFFICER (Junior Hospital Medical Officer grade). Post tenable for 1 year.

Applications, with names of 2 referees, to Group Secretary, Royal Lancaster Infirmary, Lancaster.

NEWMARKET GENERAL HOSPITAL, Suffolk. Applications are invited for the post of HOUSE SURGEON, vacant now. Duties include house charge of general surgical and some eye cases. Post resident and available for 6 months; recognised for pre-registration.

Applications, with copies of 3 testimonials, to Medical Superintendent.

NEWTON ABBOT HOSPITAL, South Devon. Senior HOUSE OFFICER (medicine), Male or Female, required 24th March, 1958. Duties divided equally between 20 acute medical beds in general section and 140 geriatric beds. This officer is also required to stand in when Senior House Surgeon otherwise engaged. Married quarters available.

Applications, stating qualifications, nationality, age, with copy testimonials, to be sent to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

NEWCASTLE GENERAL HOSPITAL. (838 Beds.) NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER, Professorial Psychiatric Unit (54 Beds). Vacant 1st April, 1958. The Unit is under the clinical direction of the Department of Psychological Medicine, King's College, Medical School, University of Durham. The Hospital is recognised for the purpose of study for the D.P.M.

Applications, together with the names and addresses of 2 referees, should be sent within 10 days of the appearance of this advertisement to the Secretary, Newcastle General Hospital, Westgate-road, Newcastle, 4.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the whole-time non-resident appointment of SENIOR HOUSE OFFICER to the Department of Dermatology at the Royal Victoria Infirmary. The appointment is for 1 year and is subject to the terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.

Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE REGIONAL HOSPITAL BOARD. RESIDENT REGISTRAR in Anæsthetics for duties at hospitals in the Sunderland area (1947 Beds). Post offers practical experience under supervision of visiting anæsthetists, and is recognised for F.F.A. R.C.S. and D.A. Opportunity will be given to attend Newcastle Medical School for lectures.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. East CUMBERLAND GROUP OF HOSPITALS. RESIDENT REGISTRAR OBSTETRICIAN AND GYNÆCOLOGIST. Main duties at City Maternity and City General Hospitals, Carlisle. Post recognised for the M.R.C.O.G. Appointment for 1 year in the first instance.

Applications, with names of 3 referees, to the Senior Administrative Medical Officer, 72, Warwick-road, Carlisle, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. REGISTRAR SURGEON, whole-time, for Hartlepools Group of hospitals. Main hospital General Hospital (210 Beds). Unfurnished flat available.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NORWICH. NORFOLK AND NORWICH HOSPITAL. Applications are invited for the appointment of Locum HOUSE SURGEON at the West Norwich Hospital (Male or Female). Duties general surgical and including burns and plastic work. The beds at this Hospital are under the control of the Consultant staff of the Norfolk and Norwich Hospital. Membership of a Medical Defence Society is a condition of appointment.

Applications, giving full details with names of 2 referees, to Group Secretary, Hospital Management Committee, St. Stephens-road, Norwich, immediately.

NOTTINGHAM CITY HOSPITAL. (811 Beds.) Applications are invited for the post of HOUSE OFFICER (obstetrics and gynæcology), recognised for pre-registration purposes, which will be graded Senior House Officer or House Officer in accordance with experience. Recognised for the M.R.C.O.G. and D.Obst. R.C.O.G. Post vacant 6th April, 1958.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Senior House OFFICER (anæsthetics) required as soon as possible. The post is recognised for the D.A. and the F.F.A. R.C.S. This is a busy general hospital giving experience in all branches of surgery.

Applications, stating age, nationality, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

OXFORD REGIONAL HOSPITAL BOARD. Senior REGISTRAR in Psychiatry at St. Crispin Hospital, Duston, Northampton. Married accommodation available. Appointment for 1 year in the first instance, and, subject to satisfactory service, renewable for up to 4 years. It may be possible to arrange transfer to another mental hospital in the Oxford Region for the second half of the appointment. St. Crispin Hospital provides full training facilities, including Electroencephalography Department and participation in child guidance work. Applicants should hold the D.P.M.

Applications, on forms obtainable from the Secretary, Committee for Senior Registrars, 43, Banbury-road, Oxford, should reach him by 15th March.

OXFORD REGIONAL HOSPITAL BOARD. Registrar in General Surgery to Kettering and District General Hospital. (60 surgical beds.) A wide range of experience in general surgery available. Single or married accommodation available. Appointment for 1 year only from 1st April, 1958.

Applications, on forms obtainable from the Secretary, Registrars Committee, 43, Banbury-road, Oxford, by 27th March.

OXFORD REGIONAL HOSPITAL BOARD. Locum SENIOR REGISTRAR in General Medicine at Northampton General Hospital. Whole-time, for 1 year from 1st April, 1958. Good opportunity for wide experience.

Applications, with full details of experience and names of 2 referees, to Secretary, Regional Hospital Board, 43, Banbury-road, Oxford, as soon as possible.

OXFORD REGIONAL HOSPITAL BOARD. Whole-time REGISTRAR in Psychiatry to St. John's Hospital, Stone, near Aylesbury (805 Beds). Duties will include assisting at the Child Guidance Clinics. Single or married, unfurnished or partly furnished accommodation available. Appointment for 1 year, eligible for extension to a second year. Applications, on forms obtainable from the Secretary, Registrars Committee, 43, Banbury-road, Oxford, should be returned by 20th March.

PAISLEY. ROYAL ALEXANDRA INFIRMARY. Junior HOSPITAL MEDICAL OFFICER for general duties required immediately.

Applications to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL, FREEDOM FIELDS. Central Casualty Department. RESIDENT SENIOR HOUSE OFFICER in Casualty vacancies, 1 immediately, and 1st April, 1958. Recognised for the F.R.C.S.

Applications, stating names of 3 referees, to be sent to the Group Secretary.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

(1) **Saint Mary's Hospital**

HOUSE SURGEON (pre-registration). Vacant now (2 posts).

(2) **Royal Portsmouth Hospital**

HOUSE SURGEON (pre-registration). Vacant 14th March, 1958.

Applications, stating age, experience and qualifications, together with the names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

St. Mary's Hospital, Milton-road, Portsmouth.

READING. BATTLE HOSPITAL. (391 Beds.) Reading AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of RESIDENT JUNIOR HOUSE SURGEON (pre- or post-registration) required in the Accident and Orthopædic Department. F.R.C.S. recognised. Also casualty duties.

Apply, stating age, qualifications with dates, nationality, present post, with copy of recent testimonial, to Secretary.

READING COMBINED HOSPITALS. Area Department OF OBSTETRICS AND GYNÆCOLOGY. (100 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the resident post of GYNÆCOLOGICAL HOUSE SURGEON at the Royal Berkshire Hospital, Reading. Vacant 8th April, 1958, and tenable for 6 months. Post recognised for M.R.C.O.G.

Write, stating age, qualifications with dates, nationality and present post, with copy of 1 recent testimonial, to Secretary.

RETFORD, NOTTINGHAMSHIRE. RAMPTON HOSPITAL. (1143 Beds for mental defectives of both sexes exhibiting conduct disorders.) SENIOR REGISTRAR. Excellent opportunities for study of psychopathic behaviour and for research. Psychiatric experience essential; D.P.M. or Part I thereof desirable. Modern house available. Candidates may visit hospital by appointment.

Applications, naming 3 referees, to Medical Superintendent by 21st March, 1958.

RHYMNEY AND SIRHOWY VALLEYS HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for CLINICAL ASSISTANT appointments for 12 months from 1st April next (i) on the pædiatric and geriatric wards of Energlyn Hospital, Caerphilly (1 session a week); (ii) on the postoperative wards at the Van Hospital Annexe, Caerphilly (2 sessions a week); (iii) in the traumatic and orthopædic department at Caerphilly District Miners' Hospital (2 sessions a week); and (iv) assisting the Consultant Anæsthetist at Caerphilly District Miners' Hospital (1 session a week). Remuneration as in paragraph 10b of terms of service for medical staffs in the Health Service.

Applications to reach the Secretary, District Miners' Hospital, Caerphilly, Glamorganshire, by 12th March.

ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE OFFICER (surgery) required immediately at the Rochdale Infirmary. Recognised for six months' F.R.C.S. experience.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

ROCHESTER, KENT. ST. BARTHOLOMEW'S HOSPITAL. MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of CASUALTY OFFICER (Senior House Officer grade) (1 of 2 in the department) vacant now. Salary £819 10s. p.a., post tenable for 6 months or 1 year.

Applications, stating age, nationality, qualifications and experience, with recent testimonials, to Hospital Secretary.

ROCHFORD, ESSEX. GENERAL HOSPITAL. Locum PSYCHIATRIC REGISTRAR required from 17th to 28th March, 1958.

Apply immediately to the Secretary.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE SURGEON (Male) required immediately. Not pre-registration appointment.

Applications should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE PHYSICIAN (Male) required from 21st April, 1958. Not pre-registration appointment.

Applications should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance :—

REGISTRAR in Dermatology based at the Western Infirmary, Glasgow.

REGISTRAR in E.N.T. Surgery, based at the Victoria Infirmary, Glasgow.

REGISTRAR in E.N.T. Surgery based at the Ear, Nose and Throat Hospital, Glasgow.

REGISTRAR in Orthopædic Surgery for duties on a rotational basis at the Royal Hospital for Sick Children and the Western Infirmary, Glasgow.

REGISTRAR in Surgery based at the Western Infirmary, Glasgow, with duties for a period at the Lewis Hospital, Stornoway.

REGISTRAR in Surgery based at Ayr County Hospital.

REGISTRAR in Obstetrics and Gynæcology at the Royal Maternity Hospital and the Western Infirmary, Glasgow.

REGISTRAR in Obstetrics and Gynæcology at the Eastern District Hospital and the Royal Infirmary, Glasgow.

REGISTRAR in Medicine based at the Victoria Infirmary, Glasgow.

REGISTRAR in Pathology based at the Victoria Infirmary, Glasgow.

REGISTRAR in Psychiatry based at Stobhill General Hospital, Glasgow.

REGISTRAR in Radiodiagnosis based at the Western Infirmary, Glasgow.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 22nd March, 1958.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications invited for the following posts:—

(*a*) ANÆSTHETIC REGISTRAR, post vacant 13th May, 1958. Successful candidate will be required to work in any of the units of the United Sheffield Hospitals.

(*b*) RESIDENT SURGICAL OFFICER (Registrar grade) at the Royal Hospital. Vacant 31st May, 1958. Post is ideal for candidates working for final F.R.C.S. The holder acts as registrar to a General Surgical Unit.

Applications for the above posts should state age, qualifications and experience, and give the names of 3 referees, and be sent to the Chief Administrative Officer, the United Sheffield Hospitals, West-street, Sheffield, 1, not later than 22nd March, 1958.

SHEFFIELD REGIONAL HOSPITAL BOARD. Sheffield NO. 4 HOSPITAL MANAGEMENT COMMITTEE. Radiotherapy Centres. Medical Men and Women desirous of taking up radiotherapy are invited to apply for the post of RADIOLOGICAL OFFICER at Sheffield. The appointment will have the status of a Senior House Officer on a salary of £819 10s. p.a. Approved courses for the D.M.R.T. (R.C.P. and S.) are held at the Sheffield National Centre for Radiotherapy, and will be open to the successful candidate, facilities being given to attend these.

Applications for further particulars should be addressed to the Secretary, Broom Cross, Tree Root-walk, Sheffield, 10.

SHEFFIELD, 6. KING EDWARD VII ORTHOPÆDIC HOSPITAL. SHEFFIELD NO. 3 HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of a SENIOR HOUSE OFFICER. The Hospital has 154 Beds, 100 of which are occupied by children. It is a modern unit for the treatment of poliomyelitis and has close contact with a nearby infectious diseases hospital. The post would suit applicants interested in children's diseases, and there is a fair amount of general medical work.

Applications, with names of 2 referees, to the Group Secretary, Sheffield No. 3 Hospital Management Committe, Lodge Moor Hospital, Sheffield, 10.

SHEFFIELD, 10. LODGE MOOR HOSPITAL. (467 Beds.) SHEFFIELD NO. 3 HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of RESIDENT SENIOR HOUSE OFFICER in Infectious Diseases commencing early April, 1958. Candidates should have held a resident appointment in a hospital. Salary £819 10s. p.a., subject to a deduction of £150 p.a. for residential emoluments. The appointment is normally for 1 year, subject to 1 month's notice on either side.

Applications, stating age, qualifications, &c., to the Group Secretary, Sheffield No. 3 Hospital Management Committee, Lodge Moor Hospital, Sheffield, 10.

SHREWSBURY. CROSS HOUSES HOSPITAL. Obstetric HOUSE SURGEON. Pre-registration post. Vacant 1st April, 1958.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) HOUSE SURGEON. Vacant 23rd April, 1958. Pre-registration candidates eligible. Recognised for the F.R.C.S.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) HOUSE PHYSICIAN, pre-registration candidates eligible. Vacant 23rd April, 1958.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY. OrthoPÆDIC/ACCIDENT HOUSE SURGEON (Senior House Officer). Successful applicant will be allowed to attend for 2 days a month at the Robert Jones and Agnes Hunt Orthopædic Hospital, Oswestry, for postgraduate study, with the Consultant. Post recognised under revised Fellowship regulations in respect of 6 months' training required for the final Fellowship examination. Vacant immediately.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum MEDICAL REGISTRAR required 31st March–13th April.

Applications, with names of 2 referees, to Secretary.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (274 Beds.) RESIDENT HOUSE SURGEONS (2) required immediately. Pre-registration candidates eligible. The posts are recognised for F.R.C.S. and offer exceptional opportunities for general experience with a Senior Surgical Registrar in a busy acute unit of 70 Beds.

Applications, with copies of recent testimonials, should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER, resident, required from 29th March, 1958, for the gynæcological and obstetric departments. Post recognised for D.Obst. R.C.O.G.

Applications to Secretary, Mid Hertfordshire Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) HOUSE SURGEON (House Officer grade) required for 1 of the 2 surgical teams. Post recognised for F.R.C.S. Post vacant 1[illegible]th April, 1958, and tenable for 6 months. Preference given to candidates seeking post under the Medical Act, 1950.

Applications to Secretary, Mid-Hertfordshire Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) HOUSE PHYSICIAN (House Officer grade) required for 1 of the 2 medical firms for duties mainly on the acute wards. Post vacant 3rd April, 1958, and tenable for 6 months. Preference given to candidates seeking post under the Medical Act, 1950.

Applications to Secretary, Mid-Hertfordshire Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS, HERTFORDSHIRE. CELL BARNES HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR required at above Hospital. This is a modern hospital where 895 mental defectives of all types and ages are under care. Approved for D.P.M. Good pædiatric experience available. Hospital may be visited by direct appointment.

Application forms obtainable from the Group Secretary, Harperbury Hospital, St. Albans, Herts, and returnable by 18th March, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Orthopædic Surgery to fill a vacancy in the approved trainee establishment at the Hastings Group of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience, with relevant dates together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 22nd March, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time SENIOR REGISTRAR in Ophthalmology to the Mid-Kent and Tunbridge Wells Group of hospitals, for duties mainly at the Kent County Ophthalmic and Aural Hospital, Maidstone, and at the Corneo Plastic Unit and Regional Eye Bank at the Queen Victoria Hospital, East Grinstead. Candidates must have had previous ophthalmic experience. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 3 referees, to be sent to the Secretary, Registrars Committee, 11, Portland-place, London, W.1, not later than 22nd March, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Urology to fill a vacancy in the Canterbury Group of hospitals, for duty mainly at the Kent and Canterbury Hospital. The successful candidate will also undertake duty at the Royal Sea Bathing Hospital, Margate, in the Isle of Thanet Group of hospitals, where there is work in genitourinary tuberculosis. The post will be vacant from 1st June, 1958. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales) and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metroplitan Regional Hospital Board, 11, Portland-place, W.1, not later than 22nd March, 1958.

STOCKPORT INFIRMARY. (163 Beds.) Applications are invited for the post of HOUSE OFFICER (general surgery), which is approved for pre-registration purposes. Recognised for the F.R.C.S.

Applications, with copies of 2 testimonials, to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. SENIOR HOUSE OFFICER (general surgery) required. Hospital recognised for F.R.C.S. Post vacant very shortly.

Applications to Hospital Secretary as soon as possible.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. RESIDENT ANÆSTHETIC REGISTRAR required 1st May. Post recognised for F.F.A. R.C.S.

Application forms obtainable from and returnable to Secretary, Windsor Group Hospital Management Committee, Almaroad, Windsor, by 15th March.

TUNBRIDGE WELLS (near). PEMBURY HOSPITAL, PEMBURY. Applications invited for appointment of SENIOR ORTHOPÆDIC HOUSE SURGEON AND CASUALTY OFFICER (Senior House Officer grade) to begin duties as soon as possible. Recognised F.R.C.S. (Eng.) and tenable for 1 year. Work includes treatment of long- and short-stay cases and traumatic surgery with large Outpatient and Fracture Clinics under 2 Consultants.

Apply, stating age, qualifications and experience, together with 3 testimonials, to Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells.

UXBRIDGE GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for the appointment of GERIATRIC REGISTRAR with established Geriatric Department under control of Consultant Geriatrician. Duties at St. John's, Mount Pleasant, and Hillingdon Hospitals. Post vacant 31st March.

Candidates may visit Hospitals by appointment with Group Secretary, from whom application forms are obtainable and returnable to, at The Furze, Pield Heath-road, Hillingdon, Middlesex, by 17th March.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (211 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital. This is a pre-registration post and is recognised for F.R.C.S. Salary according to the National Health Service scale.

Applications, with copies of recent testimonials, to the Administrator.

WATFORD. SHRODELLS HOSPITAL. Applications are invited for the post of HOUSE OFFICER, (Senior House Officer grade) to the Prediatric Unit of 38 Beds. Post recognised for the D.C.H. To take up duty at the beginning of April.

Applications, together with copies of 2 recent testimonials, should reach the Medical Administrator as soon as possible.

WESTON-SUPER-MARE GENERAL HOSPITAL. (104 Beds.) Applications are invited from duly qualified medical practitioners for the pre-registration appointment (resident) of HOUSE SURGEON. Immediate vacancy.

Applications, stating age, qualifications, together with names and addresses of 2 referees, should be addressed to the Secretary, Weston-super-Mare Hospital Management Committee.

WIGAN. ROYAL ALBERT EDWARD INFIRMARY. (200 Beds.) SENIOR HOUSE OFFICER in Orthopædic Surgery.

Applications to Secretary, Royal Albert Edward Infirmary, Wigan.

WELSH REGIONAL HOSPITAL BOARD.

SENIOR REGISTRAR in Psychiatry, Whitchurch Hospital, Cardiff (835 Beds). Single accommodation available.

REGISTRAR in Neurosurgery, Glantawe Hospital Management Committee. Based at Morriston Hospital, near Swansea, and may also be expected to serve other hospitals in the Group. This Neurosurgery Centre serves the whole of South West Wales and affords excellent experience. Resident non-resident.

REGISTRAR (obstetrics and gynæcology), West Wales General Hospital, Carmarthen (25 obstetric, 18 gynæcology beds —allocation to be increased).

Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WELSH REGIONAL HOSPITAL BOARD. UNITED CARDIFF HOSPITALS. REGISTRAR in Anæsthetics. Successful candidate will work as a member of the Department of Anæsthetics in Cardiff, partly in the Teaching Hospital and partly in other hospitals in Cardiff. Non-resident. Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WEST CUMBERLAND HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER in Anæsthetics required for work throughout the West Cumberland Group but based on Whitehaven Hospital. Good experience essential, and possession of the D.A. preferred.

Apply with full information as to qualifications and experience and giving the names of 2 referees, to the Group Secretary at Workington Infirmary.

WHITEHAVEN HOSPITAL, Cumberland. (119 Beds, pre-registration post, recognised F.R.C.S.(Ed.).) HOUSE SURGEON (first, second, or Senior House Officer post). Vacant beginning of April.

Detailed applications with dates, and names of 2 referees, to Secretary, Workington Infirmary, Cumberland.

WICKFORD (near), ESSEX. RUNWELL HOSPITAL. (1032 Beds.) SENIOR HOUSE OFFICER (Male or Female) required for one of the Consultant's divisions and to assist in outpatient work. Excellent postgraduate facilities for D.P.M. Salary £819 10s., residential charge £150.

Applications, with copies of testimonials, to the Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. HOUSE SURGEON (post recognised by Royal College of Surgeons) required for general surgery with some E.N.T. duties. Approved pre-registration post. Vacant immediately.

Applications, with copies of 2 testimonials, to Group Secretary.

WINTERTON MENTAL HOSPITAL. Winterton HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (psychiatry), at above Hospital for a period not exceeding 4 years. The appointment offers valuable experience in all branches of psychiatry at this large mental hospital where all modern forms of treatment are carried out, both at inpatient and outpatient level. The Hospital is recognised for the D.P.M. Residential accommodation is available for married or single applicants at a moderate charge. Conditions of service in accordance with the latest recommendations of the Whitley Council. Salary £852 10s.–£55–£1182 10s.

Application forms can be obtained from

C. T. COLLIN, Acting Group Secretary.

Winterton Hospital, Winterton, Sedgefield, Stockton-on-Tees.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) E.N.T. HOUSE OFFICER (Senior House Officer grade). Post recognised for the D.L.O. and F.R.C.S. examinations. Vacant immediately.

Apply, with copies of 2 testimonials, to the Secretary.

WORKINGTON INFIRMARY, Cumberland. (155 Beds, pre-registration post, recognised F.R.C.S.(Ed.).) HOUSE SURGEON (first, second or Senior House Officer post).

Detailed applications with dates, and names of 2 referees, to Secretary.

WORKINGTON INFIRMARY, Cumberland. (155 Beds, pre-registration post.) HOUSE OFFICER (obstetrical and gynæcological) (House Officer or Senior House Officer grade). Vacant end of March.

Detailed applications with dates, and names of 2 referees, to Secretary.

WORTHING GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of ANÆSTHETIC REGISTRAR in the above Group (Southlands Hospital, 411 Beds; Worthing Hospital, 210 Beds). Vacant 5th June. Post is recognised for the D.A. and F.F.A. R.C.S.

Forms of application are obtainable from the undersigned and should be returned within 14 days from the appearance of this advertisement. A. V. OAKTON, Group Secretary,

Worthing Group Hospital Management Committee.

129, Brighton-road, Worthing, Sussex.

QUEENSLAND RADIUM INSTITUTE. A vacancy exists for the position of RESIDENT MEDICAL OFFICER in the Queensland Radium Institute. Applicants should have completed 1 or 2 years of postgraduate experience when duties begin. Commencing salary for appointee with 1 year's experience £A1379½, 2 years' experience £A1939½, subject to future basic wage adjustments. Board and lodging provided or £100 living-out allowance in lieu thereof. Appointee will have opportunity for specialist training in radiotherapy in a progressive centre equipped with therapeutic apparatus ranging up to a supervoltage unit. Further particulars obtainable from the Director, Queensland Radium Institute, Herston-road, Brisbane. The Chairman of the Institute (Dr. A. Fryberg) will be in England about mid-April and may be interviewed by arrangement at Queensland House, 409–410, The Strand, London, W.C.2.

Applications, enclosing testimonials, should be addressed to the Manager, Brisbane and South Coast Hospitals Board, Herston-road, Brisbane, Queensland, Australia, before 30th April, 1958.

BRITISH GUIANA. CATHOLIC HOSPITAL, Georgetown, BRITISH GUIANA. RESIDENT MEDICAL OFFICER required immediately. Commencing salary £1200–£1400 determined by qualifications and experience, with furnished quarters and contributory pension scheme. Initial contract 3 years.

Apply, with full details of qualifications and experience, naming 3 referees, to H. R. GUY, 23, Lawrence-lane, London, E.C.2.

CANADA. HOLY CROSS HOSPITAL, Calgary, Alberta, CANADA. Applications are invited for appointments as JUNIOR INTERNS (rotating) to commence 1st July, 1958. The training in this Hospital is primarily designed as preparation for general practice. Preference will be shown in the appointments for young recently registered graduates of University Schools of Medicine.

Application forms and further details may be obtained from—
IRIAL GOGAN, M.D., Medical Director.

CANADA. KINGSTON GENERAL HOSPITAL, Ontario, CANADA. ASSISTANT RESIDENT for service in the Psychiatry Department of the above Hospital, commencing on 1st July, 1958. Applicants are expected to have had at least 1 year's experience of psychiatry.

For salary and conditions please apply Professor of Psychiatry, Queen's University, Kingston, Ontario.

CANADA. THE ONTARIO CANCER INSTITUTE, 500, Sherbourne-street, TORONTO, 5, CANADA. This new Institute and teaching Hospital of the University of Toronto seeks applications for the position of RESIDENT HOUSE STAFF for periods of not less than 6 months at a time. The appointment would suit those planning to settle in Canada and require time to work for the Dominion Council examinations. Alternatively, for those interested in radiotherapy and the investigation and management of cancer cases by means other than surgery, it would provide an excellent introduction. Stipend $200 (two hundred dollars) per month plus maintenance.

Inquiries with references to the Director.

U.S.A. BRIDGEPORT HOSPITAL, Bridgeport, Connecticut. Approved ROTATING INTERNSHIPS and RESIDENCIES available in a general hospital of 387 Beds and 60 Bassinets. Stipend of $190 per month in addition to full maintenance and uniforms. Exchange Visitor Program participant.

Address inquiries to: Chairman, Committee on Medical Education, Bridgeport Hospital, Bridgeport 10, Connecticut, U.S.A.

U.S.A. NORTON MEMORIAL INFIRMARY, Louisville, KENTUCKY, U.S.A. A 290-Bed general hospital, approved by the American Medical Association for ROTATING INTERNSHIPS of 1-year duration. Approved under Exchange Visitor Program. Only graduates from approved medical schools considered. Rotating services in medicine, surgery, obstetrics and paediatrics. Stipend $200 per month, and full maintenance for bachelors.

Apply airmail to Administrator.

U.S.A. UNIVERSITY OF MINNESOTA MEDICAL CENTER. ANESTHESIOLOGY RESIDENCIES at the above Center. 2 or 3-year programme with clinical and didactic instruction in all phases of anæsthesia. Board approval. Positions starting every month.

Address, F. H. VANBERGEN, M.D., University of Minnesota Medical Center, Minneapolis 14, Minnesota.

Public Appointments

THE MEDICAL SERVICE OF THE ROYAL NAVY

VACANCIES FOR MEDICAL OFFICERS

Candidates are invited for Short Service Commissions of 3 years, on termination of which a gratuity of £600 (tax free) is payable. Ample opportunity is granted for transfer to Permanent Commissions on completion of 1 year's total service. Officers so transferred are paid instead a grant of £1500 (taxable).

All entrants are required to be British subjects whose parents are British subjects, medically qualified, physically fit, and to pass an interview.

Full particulars from the Admiralty Medical Department, Queen Anne's Mansions, St. James's Park, London, S.W.1.

BIRMINGHAM. CITY OF BIRMINGHAM. Public HEALTH DEPARTMENT. Applications are invited from registered medical practitioners for post of ASSISTANT ADMINISTRATIVE MEDICAL OFFICER OF HEALTH (Male or Female). Candidates should hold the Diploma of Public Health. The successful candidate will have an opportunity to gain administrative experience in all branches of the Public Health Service including Maternity and Child Welfare. Salary scale £1405–£55–£1625 p.a. Commencing salary within the scale will depend upon the Medical Officer's experience. Pension scheme (including widows and orphans); medical examination. The Officer appointed will be required to devote his/her whole time to official duties and the appointment will be subject to 3 months notice on either side.

Applications, with names of 3 persons to whom reference may be made, to be sent to the Medical Officer of Health, Council House, Birmingham, 3, not later than 12th March, 1958.

BIRMINGHAM. CITY OF BIRMINGHAM EDUCATION COMMITTEE. Applications are invited from registered medical practitioners (Men or Women) for appointment as SCHOOL MEDICAL OFFICER in the School Health Service. The possession of a D.P.H. or D.C.H. will be an advantage. Salary in accordance with Whitley Council scale of £1050–£50–£1200–£55–£1475 p.a. Appointment is subject to the appropriate superannuation act and to the passing of a medical examination.

Forms of application obtainable from the undersigned (stamped, addressed envelope) must be returned by 24th March, 1958. Canvassing disqualifies.

E. L. RUSSELL, Chief Education Officer.
School Health Service, 102, Edmund-street, Birmingham, 3.

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointment as Appointed Factory Doctor is vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1 :—

District	*County*	*Latest date for receipt of applications*
BALDOCK ..	HERTFORD ..	22ND MARCH, 1958

EASTBOURNE. COUNTY BOROUGH OF EASTBOURNE. HEALTH AND WELFARE SERVICES DEPARTMENT. DEPUTY PRINCIPAL SCHOOL MEDICAL OFFICER OF HEALTH AND DEPUTY PRINCIPAL SCHOOL MEDICAL OFFICER required. D.P.H. essential. Duties administrative and clinical. A progressive interest in health educative methods directed particularly towards the promotion of sound nutrition and community mental health will be an advantage. Housing accommodation at an appropriate rental suitable to the needs of the applicant may be made available to the successful applicant if required. Salary in accordance with the scale £1305–£55–£1525 p.a. A car allowance is provided.

Further particulars and form of application, returnable by 17th March, 1958, from K. O. A. VICKERY, M.D., D.P.H., Medical Officer of Health, Avenue House, Eastbourne.

STAFFORDSHIRE COUNTY COUNCIL. Wednesfield URBAN DISTRICT COUNCIL. Applications are invited for the separate part-time appointments of ASSISTANT COUNTY MEDICAL OFFICER AND SCHOOL MEDICAL OFFICER, and MEDICAL OFFICER OF HEALTH of the Wednesfield Urban District. The appointments together will constitute whole-time, the allocations being 7 half-days and 4 half-days, respectively.

The proportionate salary for each appointment is calculated in accordance with the latest agreed scale and increments will be given for previous service in the same capacity, the ranges being :—

County Council : £763 12s. 9d.–£36 7s. 3–4d. (3)–£40 (5)–£1072 14s. 7d.

Wednesfield U.D.C. : £669 1s. 10d.–£20 (4)–£749 1s. 10d.

A car will be an advantage and an appropriate allowance will be paid. The posts are superannuable and the successful candidate must pass a medical examination and produce his birth certificate. Applicants must be fully qualified medical practitioners, with experience in public-health duties, and must hold the diploma of public health or its equivalent. The candidate appointed will, as regards the County Council duties, act under the direction of the County Medical Officer of Health and will be required to perform such duties as may from time to time be prescribed. As regards the duties of Medical Officer of Health, he will be subject to the Sanitary Officers (Outside London) Regulations, 1935 and 1951, and to the sole control and direction of the Urban District Council. The County Council appointment will be subject to 3 calendar months notice in writing on either side.

Forms of application may be obtained from the County Medical Officer of Health, County Buildings, Stafford, and should be returned to him not later than by first post on 21st March, 1958.

T. H. EVANS, Clerk of the County Council.
J. HENWOOD JONES,
Clerk of the Wednesfield Urban District Council.
County Buildings, Stafford, 20th February, 1958.

WARWICKSHIRE COUNTY COUNCIL. County Medical OFFICER OF HEALTH'S DEPARTMENT. Applications are invited from registered medical practitioners for the appointment of ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH, which is in the north-eastern area of the County. Preference will be given to those holding the D.P.H. or D.C.H. and with previous experience. Conditions of service and salary (£1050–£1475) will be in accordance with the Whitley Council. The successful candidate will be required to provide a motor car in the performance of duties, for which Whitley Council scale allowances are payable. Grant towards removal expenses will be considered.

Further particulars, including details of duties, and application forms may be obtained from the County Medical Officer of Health, Shire Hall, Warwick. Closing date for applications is 29th March, 1958. L. EDGAR STEPHENS, Clerk of the Council.

Shire Hall, Warwick. 18th February, 1958.

GOVERNMENT OF UGANDA. Vacancy for Specialist ALIENIST will occur in early August, 1958, to take full charge of Mulago and Butabika Mental Hospitals, and be responsible to the Director of Medical Services for their administration and organisation. May also be required to teach medical students at Makerere. Candidates must possess medical qualifications registrable in United Kingdom and D.P.M. Appointment on permanent basis with pension (non-contributory) at rate of 1/600th of final pensionable emoluments for each completed month of service; or on short-term contract with gratuity (taxable) of 13½% of total salary drawn excluding allowances. Candidate in National Health Service may retain superannuation rights up to 6 years and receive gratuity (taxable) of 20% of salary after engagement. Salary £2300–£2400 a year. Private practice not permitted as a right but Director of Medical Services may authorise it subject to well-defined limitations. Quarters usually available at low rental. Items of hard furniture supplied at additional rental of £12–£24 a year. Free passages in both directions, for officer serving tour of 30–36 months, i.e., 4 air passages provided for officer, wife, and dependent children, or sea passages up to cost of 3 adult fares. European primary schools in certain centres; in other centres, subsidy of £90 p.a. (or half school fees, whichever is less), for education of first child outside East Africa, with additional subsidy of £9 for second child and £18 for third or subsequent child attending school at same time. Secondary school facilities in Kenya. For a child at boarding school in United Kingdom (or elsewhere in Commonwealth) subsidy of £140 p.a. (or 3/5th of fees, whichever is less), with additions as above for second and subsequent children. Income-tax at local rates. Local leave permissible, and generous home leave granted after each tour.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117.9/019).

DERBYSHIRE COUNTY COUNCIL. County Health DEPARTMENT. ASSISTANT MATERNAL AND CHILD WELFARE MEDICAL OFFICERS AND SCHOOL MEDICAL OFFICERS. Applications are invited from registered medical practitioners for whole-time superannuable posts. Salary £1050–£50–£1200–£55–£1475 p.a. Car allowance.

Particulars and forms of application are obtainable from Dr. J. B. S. MORGAN, County Medical Officer, St. Mary's Gate, Derby, to whom they should be returned by 24th March, 1958.

DERBYSHIRE COUNTY COUNCIL. County Health DEPARTMENT. MATERNAL AND CHILD WELFARE MEDICAL OFFICER (Female). Applications are invited from fully qualified medical practitioners for this whole-time superannuable post. Candidates should be experienced in antenatal work, midwifery, and children's diseases, as they will be required to hold consultations at the Council's Maternity and Child Welfare Clinics and Centres, and to perform such other duties as may be required. Salary £1050–£50–£1200–£55–£1475 p.a., plus a car allowance.

Particulars and application forms are obtainable from Dr. J. B. S. MORGAN, County Medical Officer, St. Mary's Gate, Derby, and should be returned to him duly completed not later than 24th March, 1958.

BASUTOLAND AND SWAZILAND PROTECTORATES. MEDICAL OFFICERS with qualifications registrable in United Kingdom required for general duties. "R" practitioners, i.e., practitioners liable for call-up under the National Service Acts, may apply, and if appointed, will be granted indefiuite deferment of call-up on completion of a minimum period of 2 years.

Appointment on 2 years' probation to the pensionable establishment. Salary £940–£1515 a year, starting-point determined by age and experience. Following also payable:—

(*a*) Cost-of-living allowance of 15½ % of salary up to a maximum of £170 10s. a year for married officers and half this rate for single officers;

(*b*) Education allowance (up to 3 children under the age of 18 attending school outside territory) of £120 a year for first child, £96 for second and £72 for third.

Private practice at present permitted varying from station to station. Free passages for officer, wife and up to 3 children. Local leave permitted and generous home leave granted after each tour of 36 months. Income-tax at low local rates.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117 76/01).

GOVERNMENT OF WESTERN NIGERIA. Applications invited from Male doctors for following posts in the Medical Department of the Western Region of Nigeria:—

SENIOR PATHOLOGIST: to organise and be responsible for a Regional Laboratory Service. Most hospitals in the Region have small laboratories attached where routine work is performed, but the more complicated tests, sections, &c., will be his concern at a Central Regional Laboratory. Officer selected will also be responsible for organisation and training of African technicians, and will supervise the work of technicians in outstation laboratories, which will involve travelling. Candidates should preferably have a higher qualification and at least 5 years' experience in laboratory work.

PATHOLOGIST: who will be based at Adeoyo Hospital and be responsible for routine laboratory work and such other duties as may be delegated by the Senior Pathologist. Candidates must possess relevant experience.

MEDICAL OFFICERS OF HEALTH: who will normally be based at one of the larger urban centres in the Region, where they will be primarily responsible for public health administration of the area, with emphasis on sanitation and hygiene. Duties include school health, public health, education and propaganda, control of quarantinable diseases, and possibly establishment and supervision of maternity, child welfare, and tuberculosis centres. Candidates should hold D.P.H.

Appointments (of 1 or 2 tours) may be:—

(*a*) on short-term contract with gratuity (taxable) at rate of £37 10s. for each completed period of 3 months' service (including leave) payable on satisfactory completion of appointment. Salary for Senior Pathologist £2448 a year. Salary scale for Pathologist and Medical Officers of Health £1290–£2286 a year, or

(*b*) from National Health Service, candidate retaining superannuation rights, and gratuity (taxable) of 20 % of aggregate salary payable on completion of appointment. Salary for Senior Pathologist £2040 a year, and scale for Pathologist and Medical Officers of Health £1086–£1950 a year.

Entry points in both salary scales determined by qualifications and experience. In addition, the Pathologist and Medical Officers of Health receive supplementary pay of £120 a year, and in certain circumstances £100 a year staff pay.

Quarters provided at low rental. Taxes at local rates. Annual leave permissible, generous home leave after each tour of 12–24 months. Free return passages for officer, wife, and children (up to 3).

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117 410 044).

SOUTH PACIFIC HEALTH SERVICE. Medical Officers with qualifications registrable in the United Kingdom required for general duties in the South Pacific Health Service which includes posts in Fiji, the British Solomon Islands Protectorate, Gilbert and Ellice Islands, New Hebrides (Anglo-French Condominium), Tonga and the New Zealand Island Territories (including the Cook Islands and Western Samoa). Selected candidate would be posted to Fiji in first instance unless urgently required elsewhere in the South Pacific Health Service. Appointment on permanent basis with pension (non-contributory). Salary scale £F960–£F1850 (£F111=£100 sterling). Starting salary according to experience. Quarters, if available, at low rental: hotel allowance paid whilst making settled housing arrangements, also disturbance allowance. Free passages for officer, wife and family up to cost of 4 adult fares in all. Leave passages up to 3 adult fares. Income-tax at local rates. Educational facilities available in Fiji.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117 162 01).

GOVERNMENT OF BARBADOS. Medical Superintendent required at General Hospital, Barbados, to be responsible generally for the supervision and management of the Hospital, and for such other departmental duties as the Governor may direct; he will work under the general direction of the Director of Medical Services. Candidates must possess qualifications registrable in the United Kingdom and have had experience in hospital administration. Appointment on contract for 2 or 3 years, renewable by mutual agreement. Salary £1600 a year. Passage assistance provided. Furnished quarters at rental of £125 a year. Income-tax at local rates. Generous leave on completion of agreement. Good social and recreational amenities. Climate healthy for Europeans. Education facilities available.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting reference BCD.117/28/010).

General Practice

For an ***Executive Council post*** *(England and Wales) apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."*

IPSWICH EXECUTIVE COUNCIL. Applications are invited for VACANCY—chiefly urban—list at present 2833. Residential and surgery accommodation available for purchase. Successful applicant will be required to take over on 5th July, 1958. Apply on Form E.C.16A to the undersigned, from whom further particulars may be obtained, not later than 1st April, 1958. R. G. HUDSON, Clerk, Ipswich Executive Council.

Elm House, 25, Elm-street, Ipswich.

SALFORD (Pendleton). Applications invited for death VACANCY (urban). List at present 3100. Surgery accommodation only available. Apply on E.C.16A, not later than 22nd March, to undersigned. J. S. G. CLOUGH,

Clerk, Salford Executive Council.

Irwell-place, Crescent, Salford, 5.

Hospital Services: Non-Medical Appointments

OXFORD. UNITED OXFORD HOSPITALS. Department OF CLINICAL BIOCHEMISTRY, RADCLIFFE INFIRMARY, OXFORD. Applications are invited for the post of HOSPITAL BIOCHEMIST (senior grade) in the routine biochemical section of this department. Candidates must hold a university degree in science or an equivalent qualification. Salary and conditions of service in accordance with the Whitley scale. Details of the post may be obtained from the Director of the Biochemistry Department.

Applications, with the names and addresses of 2 referees, should be sent to the Administrator, Radcliffe Infirmary, Oxford, not later than 2 weeks after the appearance of this advertisement.

Miscellaneous

Esso Petroleum Company. Vacancies exist for 2 full-time Medical Officers, 1 at the Esso Refinery, Fawley, near Southampton, and the other in London. Candidates must be well qualified with good clinical experience, and preferably under 40 years of age. Previous industrial experience not essential. Starting salary not less than £1750. Good pension scheme. Full particulars may be obtained by writing to the Manager, Staff Employment Division, Employee Relations Department, Esso Petroleum Co., Ltd., 16, Charles II-street, London, S.W.1.

The United Kingdom Atomic Energy Authority, Industrial Group, requires a Nursing Sister at Capenhurst Works, Capenhurst, Chester, to assist with the Works nursing service, which includes medical examinations and treatment facilities. Both day and shift duties will be involved. Applicants must be State Registered Nurses. Experience in Occupational Health Nursing is desirable, and possession of the Occupational Health Nursing Certificate will be an advantage, and will attract £30 p.a. in addition to the salary quoted. Salary will be assessed within scale £557–£695. An extra allowance is payable for shift duties. A contributory pension scheme is in operation, but successful candidates may, if eligible, contribute to the F.S.S.N.

Send postcard for application form, quoting reference 2330, to Works Secretary, Capenhurst Works. Closing date: 24th March, 1958.

Pupil's exchange with Germany! Doctor's son, 16 years, from North Western Germany (near Emden), wants to go to England as an exchangee in a doctor's family from middle of June to middle of July, in London or Southern England.—Please write Address, No. 378, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Doctors requiring applications, theses copied: Write to MANTON (WESTMINSTER) LTD., 98, Victoria-street, S.W.1 (VIC. 0141), who are specialists.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimens of urine and £2 2s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Expert medico-legal photographic service. Accident, injury, claims. Any location.—Address, No. 370, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2, or PEGGY DELIUS, WEL. 7788.

Library Psychiatrist: Archæology, Philosophy, Religions, Science. Also for children. Various Equipment. Hæmoglobinometer, Hæmocytometer, Sphygmomanometer. E.N.T. and eye instruments. Radiant heat lamp. Articulated study skull. Stamped addressed envelope. List.—Dr. PRITCHARD, Beech Grove, Alverstoke, Hants.

Grundig Stenorette typist (Dorset), own machines, experienced medical terminology, undertakes work at home by post. Copy typing also welcomed. Quick return service.—Address No. 379, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

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